Heating and Ventilating

For Engineers and Contractors Controlling the Design, Specification, Installation and Maintenance of Heating, Ventilating and Air Conditioning

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THE NASH ENGINEERING COMPANY

SOUTH NORWALK, CONNECTICUT, U. S. A.

ANNUAL SUMMARY AND REVIEW—1934

IN collecting and presenting material for this summary and review, we have tried to keep in mind that such a collection has two principal uses. One is to serve as a basis for judging the immediate future, and the other is to set up a reasonably concise record of what has taken place.

When conditions are relatively stable we may put considerable dependence on past performance as a yardstick for forecasting. Under present circumstances, though, it is questionable how much dependence can be put on one year's performance as a base for foretelling what will happen during the next. This review contains material on which forecasts might be based, but we refrain from making them. The reader can easily draw up his own forecasts for himself.

The year was scarcely equal to its predecessor in spectacular business events. There was no wholesale bank-closing for example. On the other hand it was filled with events of great interest and importance to us. Building construction became better understood in its relation to business recovery and received increased attention in these programs. Steady progress was made in taking distressed residential real estate off the market by extending Federal credit. Changes in banking and finance permitted refinancing of mortgages on much commercial and industrial property. Some mortgage money for new loans actually began to appear in small amounts. Building owners were in position, because of improved rentals and collections, to make necessary repairs and even to set aside money for modernizing which could be shown to pay. General business indexes wavered but generally showed better business even though there was less of the spectacular.

Building picked up. It picked up to the point of showing an estimated volume 25 to 35% greater than in 1933. New construction was estimated to have accounted for about three-fourths of the total, with modernizing, renewal, and repair making up the remainder. It is probable that the dollar volume again reached into billion dollar figures for the first time since 1931. This increase in total volume included a modestly greater volume in new construction and a considerably greater volume in modernization. As the year closed interest was centered largely on modernizing.

Statistical Material

A number of graphs and charts are included in a following section. They show how each major equipment group fared during 1934 and also during previous years. Not only are they worth attention for themselves but they may be made the basis for watching trends. It is especially worthy of note that not all groups shared equally in the increased volume of work available during the year. HEATING AND VENTILATING's Index of the Heating Business first developed over a year ago shows that the heating business enjoyed a volume about 25% greater than in 1933.

Trade Associations

While many of the trade groups organized last year almost wholly for code purposes continued to make their NRA code their principal activity, others of longer standing continued to support programs of considerable scope. An outline is given of the chief activities of some of the older associations. Air conditioning reached a state where local associations were formed in a number of cities to encourage and promote its use.

FHA and NRA

Government in the building industry reached a new high during the year. Not only did NRA continue to demand a good deal of attention but government efforts to arouse the building industry brought forth the Federal Housing Administration as well. Both of these alphabet organizations affect all of us so directly that the principal events of the year in each are summarized. The one is now being sharply questioned and its future form and scope are by no means settled. Its effects are being debated and its whole value scrutinized. The other is not yet in full operation but already it has produced effects of definite value.

Research

In spite of the low level of business, research work continued active. Industry and commerce are well sold on its value. Our inquiry leads to the conclusion that the volume of this kind of work in our industry did not increase, however. There is reason to believe that it just about held its own. Few new research facilities were added to those in existence. In colleges the funds for research were reported sharply cut.

Following the precedent of our research review of last year, we include a detailed listing of the projects reported active at the colleges and universities. The list has been carefully brought up-to-date and represents virtually all projects active at the year-end on which any considerable amount of work was done during the calendar year.

New Equipment

For the first time there is available a comprehensive listing of the major items of new equipment brought out during a complete calendar year. Use of this section of the review permits you to keep up on equipment without depending on collecting information piecemeal and at random. Photographs and enough descriptive text accompany each item to make clear its operation, function, and features. It has been arranged into groups to permit easy following. All of us depend very greatly on our knowledge of what equipment is available to accomplish a given job. This initial listing of equipment is offered as a tool to be used.

Research in 1934

WITH the depression lifted moderately during 1934, research work felt the improvement not at all. There is some evidence that the support given to work of this kind actually fell off. This is difficult to determine, however, for while support decreased for those agencies which operate in such a way that their budgets are more or less open, there were private industrial newcomers into the field whose added support tends to offset the losses of the research institutions. There is no evidence that interest in research abated—merely funds to carry on actual programs were reduced in volume.

New research facilities were not numerous. There is no record of any outstanding new industrial or commercial laboratories being established in this country for the purpose of carrying on research in heating or ventilating. Bituminous coal interests continued with plans to establish a program. Pierce Laboratory got a program started. A two-room indoor cottage for studying the performance of air conditioners was put into operation. Several manufacturers announced plans for extension of their studies in houses erected especially for the purpose.

Neither were any revolutionary advances made in the instruments or methods of research. On the whole, probably, the recent tendency toward field study rather than strictly laboratory work continued throughout the year.

Trade Association Research

All the fuel and power groups either have their own laboratories or have now arranged to carry on research work. In the case of the anthracite, gas and electrical group, these laboratories do considerable routine testing on commercial products, and the program continued throughout the year without marked change in nature or scope. NRA code provisions made necessary the testing of certain items of equipment in order to secure ratings, and while these activities are not strictly research, still they approach it. Various groups made contributions to help support research projects. The warm-air group continued to support its long-established project at the University of Illinois. In a number of cases associations had to withdraw support from studies because of budget contractions.

British Research

Due to disturbed conditions abroad, language complications, and the difficulty of securing really reliable reports, it is not possible to outline foreign work except that done in Great Britain. Space limitations permit only a very brief statement concerning it.

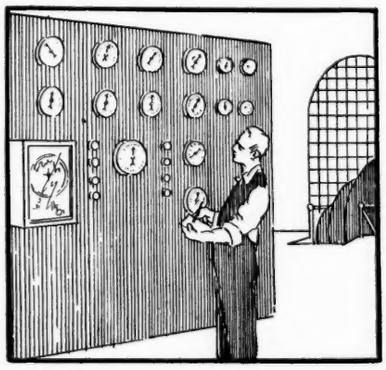
Among other agencies, government-financed and directed research is carried on by the British Building Board, the Fuel Research Board, and the Industrial Health Research Board. Projects undertaken by these various boards seem to be reasonably well coordinated —perhaps better than is true of our own government efforts.

Projects of the Health Board include one of comprehensive scope on the physiology of heating and ventilating, which has for its primary object the definition of a comfort zone for people in light and sedentary occupations. This study also includes the collection of data on the physiological basis of comfort. Results of this general project are not yet at hand. Studies were also made of the methods of measuring skin temperature and after trying a number of instruments the conclusion was reached that a radiation thermopile is the best device. Instruments for the measurement of radiant heat also came in for study during the year.

Jointly the Health and Building Boards worked on the subject of the effect of infra-red rays on comfort. This project arose because of controversy about whether or not rays of certain wave length were nose-openers or nose-closers. As a result of the project the conclusion is that the wave length is not the cause of nose closing but that this is due to rapid warming of the skin. Nose closing and the consequent discomfort can be brought about by any method of heat application. To avoid it warm the skin slowly. This subject is a live one and it is doubtful if the last word has been said.

Heat transmission through building construction is a subject of long standing interest to the Building Board. During the year thermal insulation of roof constructions was investigated as was also the effect of moisture on the thermal resistance of fiber board.

Among the projects under direction of the Fuel Board is one wherein small sizes of coal were placed in paper containers lined with thin aluminum foil and used on open grate fires. It was found that the foil serves to hold the coal together until it is converted into coke. This project has not advanced far enough to produce results with all forms of coal, but those tested were found to yield fairly strong coke.



It is also announced that after prolonged discussion, agreement has been reached on the plans for an experimental room to be erected at the station of the Building Board in Watford. This room, which is to be 12 ft. by 18 ft. in plan and so constructed that the height can be varied from 8 ft. to 11 ft., is intended to accommodate studies of an elaborate nature. The room differs from those built in this country for like purposes in that the conception of the room seems

to recognize that the problem of room heating is a problem in heat flow rather than purely a problem of measuring air temperatures. Pipes imbedded in the walls will carry heat or cold as required, and the room conditions will be governed by the temperature conditions of the wall surfaces.

On the whole, in contrast to our situation, British research work in heating seems to be expanding both in scope and in facilities.

Government Agencies

Aside from certain of the studies being made by New Deal government agencies, the two government divisions which carry on research of direct interest to our field are the Bureau of Mines and the National Bureau of Standards.

Bureau of Mines work of the year included studies on the burning of coal as part of a project of long standing on this general subject. During the year there appeared a Bulletin—No. 378—which reports results on studies of the effects of preheated air on underfeed combustion. While the conditions of the test made the results especially applicable to power stokers, the bulletin should be noted by users of underfeed stokers for heating boilers.

At the Standards Bureau, there were several projects of which the following are selected for listing.

1—Tests of air filters were made for the Treasury Department but nothing prepared for publication.

2—An alignment chart for determining relative humidity and vapor pressure from readings of wet and dry bulb temperatures for work at pressures of from 1/10 to 10 atmospheres is in process and publication is expected soon. This chart supplements one prepared last year.

3—Early in the year the Bureau published its findings on a study of lithographic paper as affected by temperature and humidity changes. The study led to the recommendation that to secure precise register in printing on such paper, the R.H. should be controlled to within plus or minus 2.5% and temperature to plus or minus 5°. Air conditioning apparatus for such plants should be designed to operate within these limits.

4—After nearly five years spent in studying the question of how best to preserve records, the Bureau published its findings in May, 1934, in its Miscellaneous Publication 144. This report recommended that air conditioning be installed in libraries in localities where there is considerable air pollution. Recommendations as to heating and ventilating are also included.

While the preparation of commercial standards is not research in a strict sense, still the work borders close to it and for that reason the preparation of standard CS 48-34 on domestic burners for Pennsylvania anthracite is mentioned here. This standard appeared in August, 1934. Preliminary work looking toward a standard for warm-air furnace blowers was also performed during the year. There is also current a proposal for the simplification of sizes, and proportions of horizontal steel heating boilers.

Endowed Institutes

With completion of the Pierce Laboratory at New Haven, a report of its program is available for the first time. The principal projects are as follows: (1) Design of a new instrument called the Thermo-Integrator for measuring heat losses by radiation and convection. This project was finished shortly before the close of the year. (2) A study of the partition of heat loss from the human body due to radiation under natural and forced convection as related to health and comfort. (3) The effect of large and small ions on human beings and animals. (4) An analysis of comfort, health, and efficiency as related to day-to-day variations in atmospheric conditions, including ionization. (5) The effect of the materials given off to the atmosphere by heated dust (such as collects on radiators of certain types) on health and efficiency.

At the Mellon Institute, where several fellowships carry on work in the field of heating and ventilating, the one on heat insulation furnished material for three research papers during the year. Work continued on the investigation of the thermal conductivities of a great variety of low and high temperature heat insulating materials.

Air pollution studies have long been one of the chief activities of the Mellon Institute. During 1934 this work centered in the cooperative RWD program of the Bureau of Smoke Regulation of Pittsburgh's Department of Public Health. In addition to routine observation of smoke conditions, the following special studies have been or are being made.

Air-borne solids: Owens automatic filter was in continuous operation, sampling air at the station on the roof of the City-County Building, filtering the solids from the air and producing a shade on filter paper for comparison with standards indicating approximate concentration; numerous samples were taken with the Owens, the Hill, and the Greenberg apparatus. Some test runs were made with electrical precipitator recommended by Drinker.

Solar radiation: continuous records of total solar radiation, as taken with the pyrheliometer, received from the Pittsburgh station of the Weather Bureau; a spectrograph, designed to measure natural solar energy in the infra-red, visible, longer ultra-violet and shorter ultra-violet and to record these either on a multiple type or on separate recorders, is nearing completion for test; experimental work with various types of photoelectrical cells to simplify apparatus and methods.

In the medical field: study, by a physician, of each death from pneumonia during the "pneumonia season"; a survey of living conditions, with special reference to type of heating equipment and fuels used, made in selected districts and the data correlated with common colds in the families contacted; a specially trained group of four physicians made a histological study of lung tissue and the effects of accompanying solids (carbon and silica) in more than 2,000 autopsy cases.

Coal problems form the subject of three researches at Battelle Institute. One, a study of the effect of moisture on the combustion of coal, was completed during

the year. Another, on the smoking tendencies of coals, is in progress. A third project aims at eventual development of a group of tests to enable more accurate evaluation of coal for steaming and carbonization. Progress is reported on this study during the year.

Fundamental work in the heat emission from the human body carried on at the Carnegie Institution of Washington resulted in the announcement of new values for this emission which were generally smaller than those announced by other investigators. Studies of a similar nature reported from the Russell Sage Institute of Pathology suggest that the color of the skin is of no importance so far as the heat radiating power of the skin is concerned.

Society Research

The research laboratory of the A.S.H.V.E. has weathered the four years of the depression in spite of difficult going. While the depression continued to curtail the activities, 1934 is the first year during this period that the budget anticipated at the beginning of the year did not have to be further cut before the year closed. Hence, it may be hoped that the worst is over as far as support is concerned. During the year the laboratory operated under about the same budget as it did during 1933.

The main activity at the laboratory was directed toward the solution of the single highly complicated problem of improving methods for estimating heating requirements of buildings, and also included a parallel study of cooling requirements of isolated offices in an office building. This work was carried on under a technical advisory committee consisting of D. S. Boyden, chairman, P. D. Close, W. H. Driscoll, H. M. Hart, P. E. Holcombe, V. W. Hunter, E. C. Rack, F. B. Rowley, R. J. J. Tennant, and J. H. Walker. A study was made during the last half of the last heating season in the Grant Building, Pittsburgh, where eight rooms located on different exposures of the 7th, 18th, and 27th floors were studied. Each of these rooms was electrically heated, with accurate measurement of the electrical input. Temperatures through the rooms, adjoining spaces, and air outside the windows, together with wall, floor, ceiling, and glass surface temperatures, and the rate of infiltration, were determined, in order to compare the calculated heat loss with the actual heating requirements of the rooms. Wind velocities outside of the windows of the eight rooms were determined at frequent intervals, and the wind velocity and direction at these points compared with those reported by the Weather Bureau. The results of this study have been only partially analyzed and published in a paper "Wind Velocities Near a Building and Their Effect on Heat Loss." Additional results of the study are being analyzed for publication.

During the past summer three of the eight rooms studied in the Grant Building during the previous winter were cooled with mechanical unit room coolers, and the rate of heat extraction in order to maintain the desired indoor temperatures was accurately determined and compared with the calculated heat gain based upon temperature observations in and about the rooms, infiltration, and solar radiation effects. This study will result in the presentation of the paper "Cooling Requirements of Rooms in an Unconditioned Office Building," at the annual meeting of the society this month.

The Committee on Research found it necessary during the year to further curtail contributions to cooperating universities for research carried on by them, but in all cases the universities have continued to cooperate with the committee toward the solution of these problems; in some instances at a lower rate of activity, but with the same keen interest. In this connection, the committee is still cooperating with the University of Illinois, University of Minnesota, University of Wisconsin, Agricultural and Mechanical College of Texas, Michigan School of Mining and Technology, Case School of Applied Science, and Harvard University. To this list was added the cooperation with Marquette University and Cornell University during the past year.

Colleges and Universities

From all indications 1934 was no exception to the story of the past several years covering research work at the colleges. It has been carried on only under increasing difficulty due to reductions in both staffs and funds. Few institutions remain able to provide full-time staffs to direct their research work in heating, ventilating, or air conditioning. Even where projects of long standing are still continued as "active" the degree of activity has been reduced.

Notable is the beginning of research studies in the domestic use of electricity for heating (among other applications). These studies, being made under the direction of the University of Tennessee and the State College of Washington, are expected to be broad in scope and to include field studies.

In addition to the projects listed below, two were active at Texas A. & M. One, cooperative with an insulation manufacturer, is concerned with summer comfort. The other, cooperative with A.S.H.V.E., is a study of the heat losses from buildings to check factors now used in computing such losses. Both are under the direction of Dr. F. E. Giesecke.

Studies made on hay fever and asthma patients in an air conditioned ward at the University of Illinois led to the conclusion that maintenance of low humidities and steady temperature is desirable in relieving such cases even when the air is carefully filtered to remove pollen.

No reports were received concerning the present situation surrounding a number of projects known to be active a year ago. It seems reasonable to conclude that they have either expired or passed into the inactive state. As the list of projects following was compiled as a result of a questionnaire sent out near the close of the year, it is believed to show the situation substantially as 1935 starts.

Research Projects at Colleges and Universities

Steam and Hot Water Heating

Economy of Flexible Joint Cast-Iron Pipe for Underground Condensate Return Lines. At and sponsored by the University of Tennessee. Directed by Prof. W. R. Woolrich. Condition:—active. Results to date: —Original line found to operate satisfactorily, and a second line, 160 ft. long, about to be installed to serve a new building.

Overall Efficiency and Heat Transfer in a Round, Cast-Iron Heating Boiler with Various Ratios of Radiant to Convection Heating Surface, (a) When Hand-Fired, and (b) When Stoker-Fired. At and sponsored by the University of Kentucky. Directed by Prof. L. S. O'Bannon. Condition:—active.

Comparison of Heating with Direct Radiation and with Unit Heaters. At the University of Wisconsin. Sponsored by the University and the A.S.H.V.E. cooperatively. To be reported on at the annual meeting of society. Directed by Professors G. L. Larson and D. W. Nelson. Condition:—active during the heating season of 1934-35.

Economy of Lowering Temperatures During Unoccupied Periods and the Resulting Peak Loads on the Vacuum Pump. At the University of Wisconsin. Sponsored by the University and the A.S.H.V.E. cooperatively. Directed by Professors G. L. Larson and D. W. Nelson. Condition:—active during the heating season 1934-35.

Survey of Public School Building Heating and Ventilating Systems. At and sponsored by the University of Wisconsin. Directed by Professors G. L. Larson and B. G. Elliott. Condition:—in progress in 1934-35.

Survey of Oil-Burning Heating Plants in Residences. At the University of Wisconsin. Sponsored by the University and A.S.H.V.E. cooperatively. Directed by Professors G. L. Larson and D. W. Nelson. Condition: —active during the heating season 1934-35.

Room Heating with Direct Radiators and Convectors. At University of Illinois. Sponsored by the University and the A.S.H.V.E. cooperatively. Directed by Professors A. C. Willard and A. P. Kratz. Continuing project of several years' standing. Condition:—active.

Tests of a Duo-Stat on a Forced-Circulation Hot-Water Heating System. At and sponsored by Ohio State University. A thesis project. Directed by Prof. A. I. Brown. Condition:—completed in 1934. Results in University Library.

The Dissipation of Heat from Cast-Iron Surfaces. At and sponsored by Ohio State University. A post-graduate thesis project. Directed by Prof. K. W. Stinson. Condition:—completed in 1934. Results in University Library.

Relation Between Condensation in Returns of Steam Heating Systems and Corrosion. At the Michigan College of Mining and Technology. Sponsored by the College and A.S.H.V.E. cooperatively. Condition:—early publication of results expected.

Development of a Simple Instrument for Measuring Radiant Heat. At and sponsored by Harvard University. Condition:—active; no results reported to date.

Heat Emission of Concealed Hot Water Radiators at Different Mean Temperatures. At and sponsored by the University of Toronto. Directed by Prof. E. A. Allcut. Condition:—inactive in 1934.

Characteristics of Unit Heaters Using Super-Heated Steam Compared to their Performance when Using Saturated Steam. At Pennsylvania State College. Sponsored by Mechanical Engineering Department. Directed by R. D. Fellows. Condition:—in progress.

Testing of Vacuum Return Pumps. At University of Detroit. Directed by Prof. F. J. Linsenmeyer. Condition:—in progress, approaching completion.

Modification of Hot Water and Steam Radiators to Controlled Humidity of Room Atmosphere. At and sponsored by University of Washington. A thesis project, by Watt and Hagbo. Directed by Prof. E. O. Eastwood. Condition:—in progress, no results reported.

Requirements, Demands and Practices in Heating College Buildings. At and sponsored by Lafayette College. Directed by Prof. E. N. Fernald. Condition: —work finished on one building, temporarily inactive.

Investigation of Draft Hoods for Gas-Boilers and Gas Conversion Boilers. At and sponsored by the University of Arkansas. Directed by C. L. Price. Condition:—experimental work nearly completed.

Steam Atomizing for Domestic Oil Burners. At University of Detroit. Directed by Prof. F. J. Linsenmeyer. Condition:—completed during year.

Heat Transfer

Heat Transfer in Heat Exchanger with Various Size Tubes, Arrangement of Baffles, and the Use of Various Fluids. At and sponsored by The University of Texas. Continuation of a project started in 1929. Results of earlier work published in 1931.

Heat Transfer and Pressure Drop in Narrow, Rectangular Air Ducts. At and sponsored by Stanford University. A thesis by Max Marks, covering film coefficient and pressure drop in a ⅛ in. by 5 in. copper-walled, steam heated duct with air moving at various velocities, has been completed. An additional thesis by K. C. Burch and F. H. Taylor on same project, with gaps between copper walls ranging from ¼ in. to ½ in., now in progress. Project directed by Prof. L. Washington.

Permanent Growth Characteristics of Alloy Cast Iron When Exposed to a Temperature Gradient. At and sponsored by University of Washington. A thesis project, by Trobey and Meacham. Directed by Prof. G. S. Schaller. Condition:—active, no results reported.

Transmission of Heat Through Various Thicknesses of Materials (Hot Plate Apparatus). At and sponsored by the University of Toronto. Directed by Professors

E. A. Allcut and R. W. Angus. Condition:—active, but curtailed.

Heat Transmission Through Walls of Various Materials. At the University of Toronto. Sponsored by the University. Directed by Prof. R. W. Angus. Condition:—inactive during 1934.

Surface Film Heat Transfer Coefficients for Various Boiling Refrigerants. At and sponsored by The Pennsylvania State College. Directed by Professors F. C. Stewart, F. G. Hechler, and E. R. Queer. An extensive project with experimental work, largely by graduate assistants for post-graduate degrees.

Heat Transfer Coefficients of Insulating Materials with Variable Moisture Content. At and sponsored by The Pennsylvania State College. Directed by Professors F. G. Hechler and E. R. Queer. Condition:—active, in progress.

Heat Transfer Coefficients for Fin Tube Cooling Units. At Georgia School of Technology. Sponsored by the School and commercial companies. Under direction of Mechanical Engineering Department. Condition:—nearly completed late in 1934.

Film Conductances for Heat Flow Through Tubes to Air-Water Vapor Mixture, Flow Normal to Tubes, Tube Temperature Less Than Mixture Temperature. At and sponsored by the University of California at Berkeley, and directed by G. R. MacPherson. Condition:—in progress.

Periodic Heat Flow (Theoretical Development). At and sponsored by the University of California at Berkeley. A thesis project, directed by H. A. Johnson. Condition:—in progress.

Ventilation and Air Flow

Methods of Air Measurement in Fan Testing. At and sponsored by Ohio State University. Directed by Prof. A. I. Brown. Condition:—in progress during 1934.

Infiltration of Air into Buildings. At the University of Wisconsin. Sponsored by the University and A.S.H.V.E. cooperatively. Directed by Professors G. L. Larson and D. W. Nelson. Condition:—inactive at present.

Study of Proposed Ventilating System for New Chicago Subway. At the University of Illinois. Sponsored by the University and Bureau of Subways of the City of Chicago. Directed by Professors Willard and Severns. Condition:—preliminary work completed.

Friction Factor and Non-Isothermal Low Velocity Flow Through Tubes (Theoretical Development). At the University of California, Berkeley. Sponsored by the University. Directed by Prof. V. H. Cherry. A thesis project. Condition:—in progress during 1934.

Study of Air Flow through Orifices at Low Pressures. At Georgia School of Technology, under direction of Mechanical Engineering Dept. Condition: — nearly complete.

Testing of Centrifugal Fans Using Different Shaped Blades. At Georgia School of Technology, under direction of Mechanical Engineering Department. Condition:—active during 1934.

Minimum Air Requirements for Ventilating and Air Conditioning. At Harvard University. Sponsored by A.S.H.V.E. Directed by Prof. C. P. Yaglou. Condition:—in progress during 1934.

Coefficients of Friction in Large and Small Ducts as Affected by Wall Roughness (Application to Chimney Design). At and sponsored by Johns Hopkins University. Directed by Prof. J. C. Smallwood. Condition:—active during 1934. Results:—effect of four different wall roughness types on flow in 12-in. diameter duct; effect of one type of roughness in 8-in. diameter duct, and now under investigation, effect of the same type of roughness in ducts of 6, 8, 9, 10 and 12-in. diameter. Not published.

Air Conditioning

Use of Ice in Domestic Air Conditioning. At University of Nebraska. Graduate thesis by Harold L. Kipp in Department of Mechanical Engineering. Directed by Prof. Jiles W. Haney. Condition:—complete, results in university library.

Air Conditioning in Homes. A bulletin to be issued by the University of California under the sponsorship of the California Committee on the Relation of Electricity to Agriculture, and by B. M. Woods and B. F. Raber as authors, professors of mechanical engineering at the University. Approximate publication date February, 1935. Condition:—in progress.

Treatment of Disease with Ionized Air. At and sponsored by Harvard. Directed by Dr. J. Wilson. Condition:—in progress.

Daily and Seasonal Changes in Atmospheric Ionization, Outdoors and Indoors, 1930-1933. At Harvard University. Sponsored by Harvard. Work carried out cooperatively with A.S.H.V.E. Condition:—active during the year; first report appeared January, 1934.

Physiological Effects of Atmospheric Ionization. At and sponsored by Harvard University. A thesis project for postgraduate degrees. Condition: — in progress; partial results reported in Journal of Industrial Hygiene, September, 1933.

Methods of Artificial Ionization. At and sponsored by Harvard University. Directed by Prof. C. P. Yaglou. Condition:—active, in progress.

Artificially Ionized Air, Physiological and Biochemical Effects. At and sponsored by Harvard University. Directed by Prof. C. P. Yaglou. Condition:—active.

Refrigeration Requirements in Domestic Summer Cooling. At the University of Illinois. Sponsored by the Engineering Experiment Station, A.S.H.V.E., National Warm Air Heating and Air Conditioning Association, Utilities Research Commission, and industrial companies. Directed by Professors A. C. Willard and A. P. Kratz. Condition:—active during 1934.

Economy of Steam Jet Vacuum-Refrigeration. At and sponsored by The University of Texas. Directed by Prof. H. E. Degler. Condition:—active, during 1934.

Well Water as a Cooling Medium for Domestic Air Conditioning. At Kansas State College. Sponsored by Engineering Experiment Station. Condition:—active during 1934.

Miscellaneous

Residence Heating with Warm Air, both Gravity and Forced Circulation. At the University of Illinois. Sponsored by Engineering Experiment Station and National Warm Air Heating and Air Conditioning Association. Condition:—active during 1933; continuation of a long-standing project.

Electric Panel Heating vs. Steam Heating for an Isolated Installation. A special problem arising in connection with heating of isolated McDonald Observatory. Experimental work at The University of Texas. Directed by Prof. H. E. Degler. Condition:—active in 1934.

Stability Limits of Natural Gas Flames. At and sponsored by the University of California at Berkeley. Directed by Hugh H. Hyde. A thesis project. Condition:—completed.

Hydraulic Type Temperature Regulator. At University of Detroit. Under direction of Prof. F. J. Linsenmeyer. Condition:—completed during year.

Combustion Characteristics of a Single Retort Underfeed-Stoker. At and sponsored by Ohio State University. A thesis project. Directed by Prof. Paul Bucher. Condition:—completed in 1934. Results in University Library.

Efficiency and Design of Fireplaces Adapted to Southern Homes. This project, which originated at the University of Tennessee, is being further sponsored by the Tennessee Valley Authority, and has reached the point of new designs being installed and in actual operation in an experimental home. Directed by Prof. W. R. Woolrich.

Studies of an Electric Unit Radiator. At University of Detroit. Directed by Prof. F. J. Linsenmeyer. Condition:—in progress.

Study of Electrical Heating of Dwellings at Mason City, Wash. Direction of the State College of Washington. Project at Mason City is a contractor's camp of 360 houses all electrically heated near Grand Coulee, Wash. Condition:—active. No results reported to date.

Year's Statistical Summary Shows 1934 as 25.4% Better than 1933

WHEN this statistical summary of the year's business activity was prepared for 1933 the figures in whole and in part were discouraging, with a few bright spots here and there only if one were optimistic. This, too, in spite of the fact that general business had improved over '32. The heating business showed little or no improvement over the preceding year.

Last year the situation was quite different. Heating business picked up to a marked extent, and in the closing months of 1934 the pick-up was even more pronounced than that of general business.

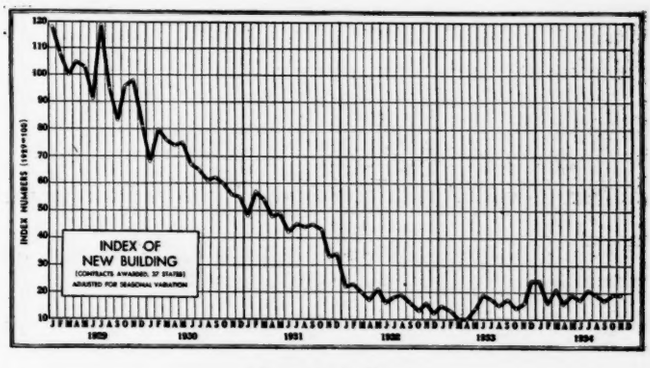
Unfortunately, figures for most branches of the industry are not available for the months later than October so that comparisons are all based, unless otherwise noted, on the first 10 months of 1934 as compared with the corresponding period in 1933. Under present conditions it seems quite safe to assume that figures for the last two months of the year will still line up with the per cent of change as noted later, with a good possibility that figures for the closing months may still further accentuate the gain.

In analyzing the year's business we will pay little attention to business in general, summarize the new building situation, give what information is available on modernizing, and then consider in more detail the component branches which make up the heating, ventilating, and air conditioning industry.

General Business

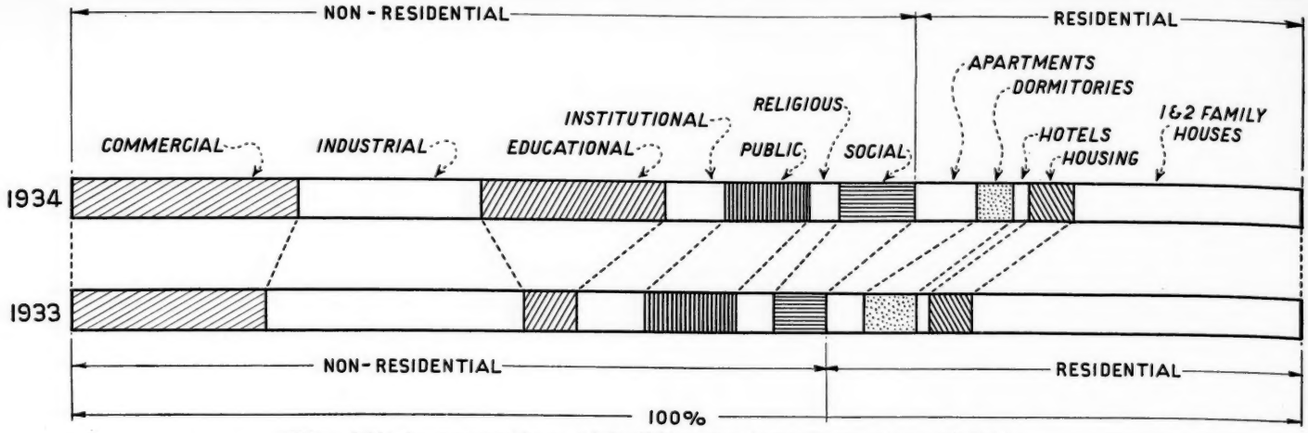
Heating and ventilating business is affected, naturally, by general business conditions. For this reason a glance at the trends of business in major industries seems worth while.

Business in general increased during the early months of 1934, reached a peak in May, then slowed down, following which it declined at about the same rate as it had increased. It reached bottom in September, then again recovered slowly, with the last available reports as we go to press indicating that December figures may show a substantial gain over November.



New Building

Figures on new building construction in 1934 can be studied with considerably more enthusiasm than was the case a year ago. Then we reported a decline of 20% in 1933 contracts from 1932. Now it is pleasant to note a 29.4% increase for 1934 over '33. The following table shows the increases and decreases in various types of new building in 1934 as compared with the preceding year.



The shift in proportions of building by type from 1933 to 1934

COMPARISON OF NEW BUILDING IN 1934 WITH 1933
(CONTRACTS AWARDED, DOLLAR VOLUME, BASED ON F. W. DODGE CORPORATION DATA FOR 37 STATES, 11 MONTHS)

Commercial	+ 54.3 %
Industrial	— 8.2
Educational	+ 377.0
Hospitals and Institutions	+ 6.1
Public	+ 21.2
Religious and Memorial	+ 3.7
Social and Recreational	+ 82.4
TOTAL NON-RESIDENTIAL	+ 82.4 %
Apartments	+ 87.3%
Dormitories	— 26.4
Hotels	+ 36.6
Houses	— 9.4
Housing Developments	— 20.4
TOTAL RESIDENTIAL	+ 4.0%
TOTAL, ALL NEW BUILDING	+ 29.4%

Total new building contracts in 1934 were about $930 million. In 1933 this total was at the low of $718 million, compared with $836 million in 1932.[1] In other words, *new building during 1934 definitely turned the corner,* reversing the five-year decline.

The increase in total new building was notable; so were a number of other points shown by a study of the data. Prominent were: the shift in relative importance of different types of buildings, the marked increase in new commercial and educational building and apartments, and the decline in volume of new houses and housing developments.

The shift in types of new buildings is shown by the accompanying graph. The lengths of the bars represent 100%; the subdivisions show the portion of new building for 1933 and 1934 devoted to each broad type.

Among the notable gains in new commercial buildings were those in garages, service stations, office buildings, and warehouses. Stores and banks showed a moderate increase.

Although new industrial building fell off this was not true in all the sub-classes of industrial buildings. There was considerable activity in 1934 in building of new chemical plants and a very sharp drop-off in food products buildings and those built by the petroleum industry. Another increase, of about 65%, was shown by the textile industry, with a 30% increase among miscellaneous industrial buildings.

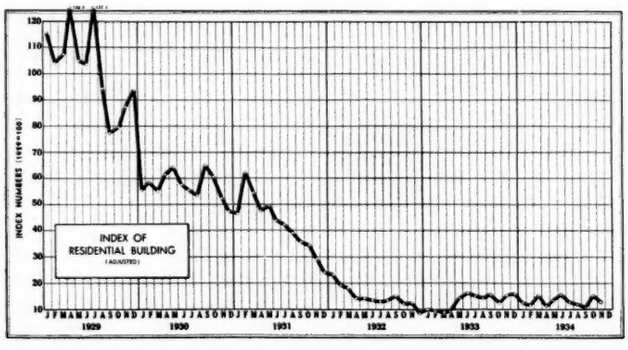
The gain in new educational buildings extended over the whole range of buildings of this type, including gymnasiums, libraries, laboratories, colleges and schools, with the last two accounting for about 86% of all new educational buildings.

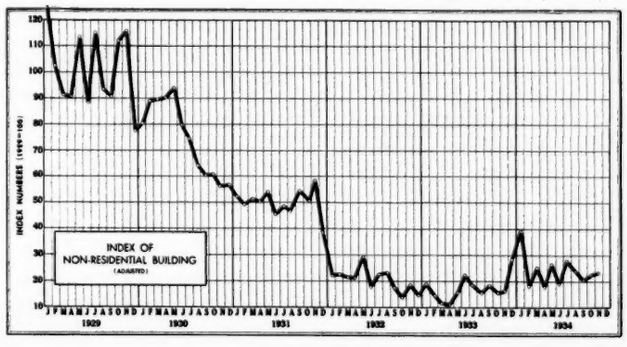
In the hospital and institutional group, the great majority of which was in the former type, there was a drop-off in hospitals, but a very sizable increase in new institutional building. A gain was reported by all types of public buildings, except post offices, which declined about 50% from 1933. About half of the 1934 volume of new public building was devoted to city halls and capitals, with military and naval buildings amounting to about half as much. New post offices and fire houses altogether amounted to about half as much as the buildings for the army and navy. Churches showed a moderate increase from about $13 million to $15 million. Convents and memorial buildings dropped off somewhat.

There was a sharp increase in the volume of new auditoriums, halls, and park buildings in 1934 and about a 75% increase in new theater building.

In new residential building it is interesting that in

[1]These figures are from Dodge data for 37 states, plus 10% for the estimated volume in the 11 Pacific states.





the single-family dwellings there were over $101 million worth built for the owner to occupy as compared with $32 million for sale or rent. In the residential building class, surprisingly enough, in view of the widespread interest in the subject, housing developments increased only from $22.3 million to $26 million.

So much for new building. What do the "contemplated work" figures show?

In 1933 the volume of contemplated work reported during the month of January amounted to only $40 million. This increased steadily from the spring on until in December, 1933, the volume reported was $259 million. This indicated a good year in 1934 for non-residential building, which it proved to be. November, 1934, the last month for which these data are available, showed that this type of proposed work amounted to slightly over $41 million.

Modernizing

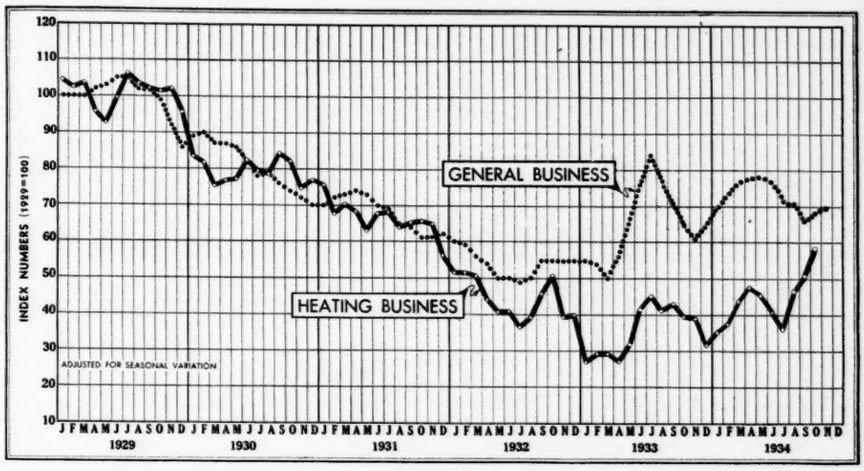
Volume of loans made under the provisions of the National Housing Act by FHA furnish a clue to the amount of modernizing, replacement, and repair work done in buildings. They do not, however, show accurately how much this type of work has increased due to the stimulation of the Housing Act. FHA estimates that a total of $164.5 million in repairs and modernizing was spent from the beginning of the drive through December 14.[2]

A further clue as to the increase, however, is reflected in the building permit data reported to the Bureau of Labor Statistics of the U. S. Department of Labor. This organization reports that permits for additions, alterations and repairs for November, 1934, amounted to $1,770,840, as compared with $760,434 for November, 1933, an increase of 132.9%.

It is believed that the FHA drive has doubled the volume of modernizing work. This seems to be borne out by the Bureau of Labor Statistics figures just quoted. That being the case, the year's volume of modernizing work amounted to about $350 million. This, together with the new building total of $930 million, brings the 1934 building construction figure to $1.28 billion. Thus, new building accounted for 73% of building activity, modernizing 27%. These figures of course apply to the whole building field, and give us no clue to the volume of heating and ventilating modernizing.

[2]This does not mean that FHA insured loans totalled this. The total amount of loans insured by FHA through December 14 amounted to $26,544,691.

HEATING AND VENTILATING Index of Heating Business Activity


INDEX NUMBERS (1929=100)
GENERAL BUSINESS
HEATING BUSINESS
ADJUSTED FOR SEASONAL VARIATION
J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D
1929
1930
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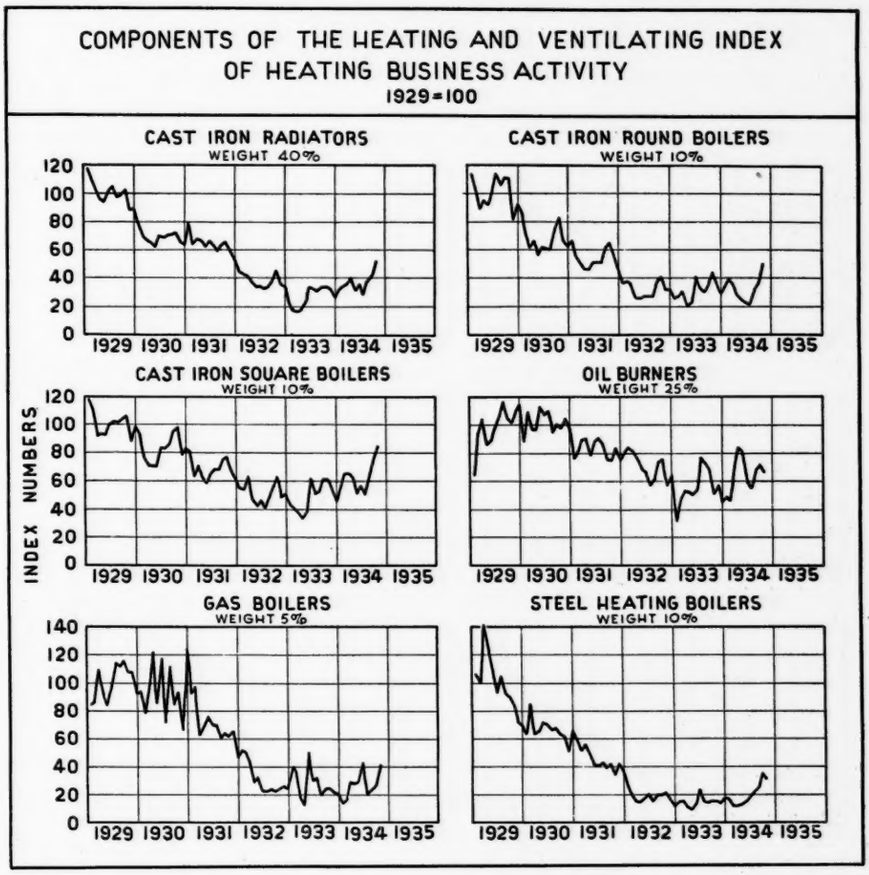
1934

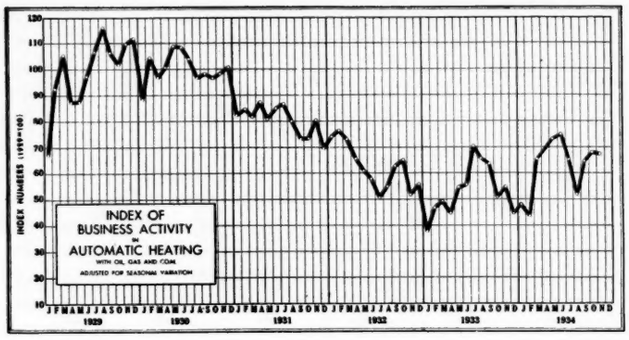


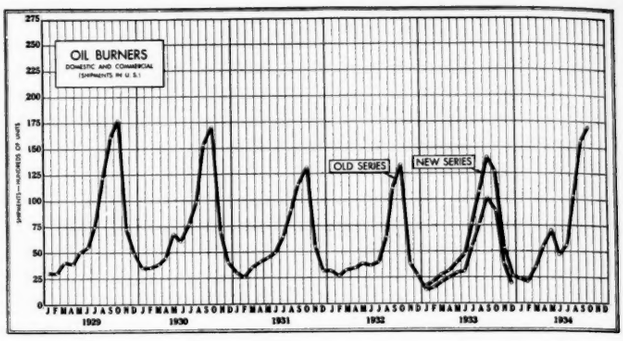
Heating

The accompanying chart of HEATING AND VENTILATING's Index of Heating Business shows graphically the trend during the last few years.[3] The heating business paralleled the increase in general business in the first third of the year and its decline in the second third. The parallel stops here, however, and the heating index rose sharply from 35.3 in July to 58.1 in October, while general business fell off. Considering the first 10 months of 1934 as compared with the same period in 1933 the index showed a gain of 24.5%. Some of this increase, and possibly the greater part of it, was probably due to the government-backed drive on modernizing.

Immediately below the heating index chart are six

[3]This index is corrected for seasonal variation. Full details concerning its construction may be found in HEATING AND VENTILATING, November, 1933, page 7.





graphs showing the trend of the components which make up the heating index, all adjusted for seasonal variation. Note that of these six, square boilers were in a better position relative to 1929 than any other series, including oil burners.

Automatic Heating: For the second time the Index of Business Activity in Automatic Heating is presented.[4] This index shows that during 10 months of 1934 automatic heating business gained 15.4%. Further, whereas in '33 automatic heating equipment made a better record than other heating apparatus, during 1934 this was reversed and straight heating made a substantial gain over the preceding year. It closed the year in about the same relative position compared with 1929 as did the automatic heating business.

Oil Burners: Total oil burner shipments in the United States were 82,104 in 10 months of 1934 as compared with 70,542 in the same period of 1933—16.4% better than in '33. It is probable that a greater number of sales would have been made had it not been for the flurry over the increase in fuel oil prices last spring. This resulted in a sharp decline in the number of burners sold.

Included in the 1934 figures were 6,953 boiler-burner units and 603 furnace-burner units sold during the first 10 months of 1934. Comparable figures for 1933 are not available.

Stokers: A spectacular gain was again reflected in the stoker business. The word "again" is used because the stoker also showed a good rise in 1933 as compared with '32. 1934's increase was 19.2%.[5]

The number of stokers in the three classes ranging from residential to large commercial sold in the first 10 months of 1934 totalled 15,131. This was made up of over 85% residential stokers, somewhat less than 10% of small commercial type and approximately 5% large commercial stokers.

Gas Heating: Although not quite so recent as other figures appearing on these pages, probably the best data showing the progress of gas heating are those collected by the House Heating and Cooling Committee of the American Gas Association. These figures[6] show the total number of various kinds of gas-heated systems on the lines of utilities as of July 1 as compared with July 1, 1933.

The following table summarizes these data:

INCREASES IN GAS-HEATED INSTALLATIONS

(As Of July 1, 1934, As Compared With July 1, 1933)

Gas-designed, radiator-heated house installations....	1.8%
Conversion, radiator-heated residential installations.	45.1
Gas-designed, warm-air heated residence installations	8.5
Conversion, warm-air heat residential installations..	11.4
Gas-designed, radiator-heated non-residential installations	20.8
Conversion, radiator-heated non-residential installations	18.5
Gas-designed, warm-air-heated non-residential installations	57.1
Conversion, warm-air-heated non-residential installations	34.6

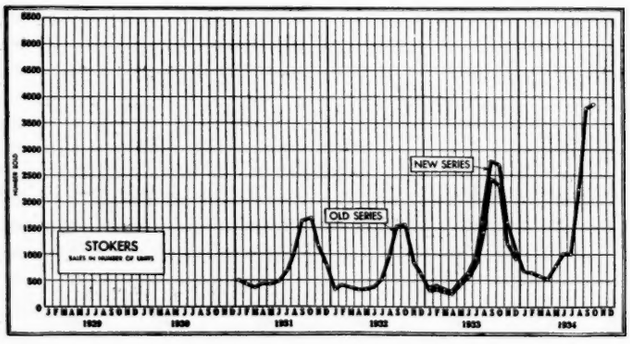
There were approximately 100,000 gas conversion residential installations reported on utility lines as of July 1, 1934, and about 7,500 conversion jobs in non-

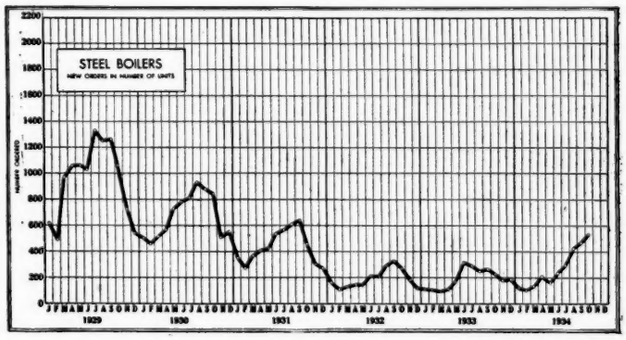
[4]This index, which first appeared in the January, 1934, issue, is seasonally adjusted and based on sales of automatic oil burners (U. S. only); gas boilers; and residential, small commercial, and large commercial stokers. Power stokers are not included.

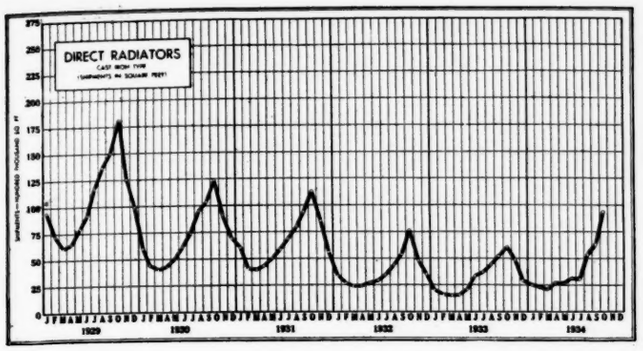
[5]On two of the accompanying charts, that for stokers and that for oil burners, it will be noted that there are two curves on each, one labelled "New Series," the other "Old Series." The old series curve is from figures representing a certain number of manufacturers who formerly reported their sales, whereas the new series represents the data from a larger number now reporting.

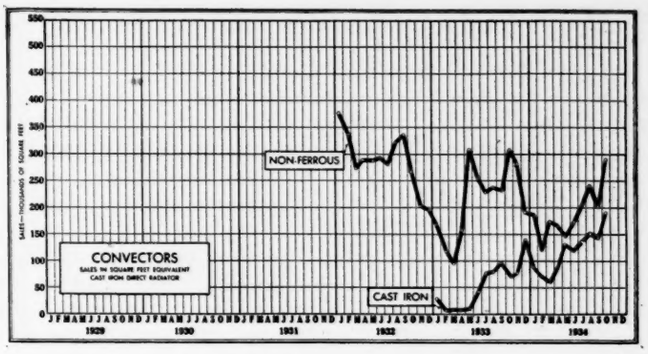
It is to be noted also that many of the figures given here are representative only of the majority of firms in a given industry and are not necessarily for the entire industry, since some manufacturers cannot be persuaded to report their figures. This is true of stokers, an industry in which one of the largest producers does not supply data.

[6]Which will be published in some detail in the February issue of Heating and Ventilating.









residential installations. The greatest increase reported in the gas heating industry was in conversion installations in residences, which rose 179% in radiator-heated houses and 178% in warm-air dwellings in '34 compared with '33.

Boilers: The best comparative record made in the boiler group was that of the square cast-iron boiler type, shipments of which increased, in units of physical volume, 26.8% for 1934 as compared with 1933. The gain by round boilers was 5.7%.

Increased activity in non-residential building was reflected in an increase in the steel boiler business, although the increase was not so marked as the rise in non-residential building. The number of steel boilers sold in 1934 increased 38.4%, while the volume in terms of square feet of heating surface increased 35.1%.

Radiators and Convectors: Probably the best single index of the heating business in general is the sale of direct cast-iron radiators, which in 1934 showed a gain of 25% over the preceding year.

A notable gain was shown by cast-iron convectors, indicating a really astonishing growth in the popularity of this type equipment. The increases for 1934 as compared with the previous year are 176% in terms of square feet of heating surface, and 180% in dollar volume. When the final figures for the complete year of 1934 are available there will have been sold over $310,000 worth of these units.

Non-ferrous convectors amounted to considerably more in dollar volume in '34 than the cast-iron type, but in comparison with '33 these units lost slightly. Well over half a million dollars worth of these units were sold during the year. As compared with last year there was a decline of 1.3% in the number of square feet of heating elements sold separately, but the value of these showed a gain of 2.9% over the preceding year. The complete units, including cabinet and grilles, showed a decline of 14.4%, as compared with 1933, in terms of square feet of heating surface, and a loss of 5.1% in dollar volume.

Unit Heaters: In spite of a decline of 8.2% in new industrial building, sale of unit heaters showed a very high increase over 1933, amounting to 92%.

Unit Ventilators: The 377% increase in educational building in 1934 was reflected in a sharp gain in the sale of unit ventilators, up 168% over the previous year.

Ventilating and Air Conditioning

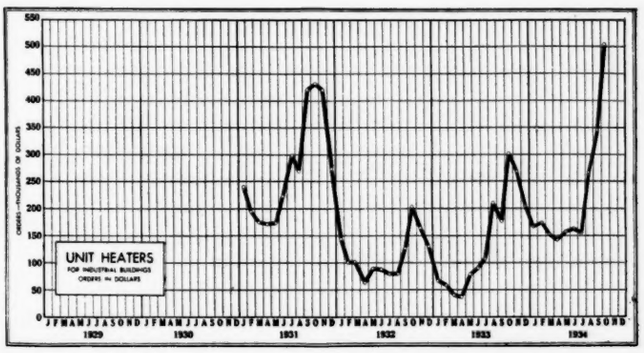
Fans and Blowers: Blowers sold for ventilating work in public and semi-public buildings showed a rise of 39.1% in 1934 as compared with '33. A smaller increase of 17.9% was registered by propeller-type fans. Motors for fans and blowers sold separately from the fan increased 18.6%. A gain of over 50% was shown in the sale of steam turbines for driving fans and blowers but sold separately from the air moving mechanism.

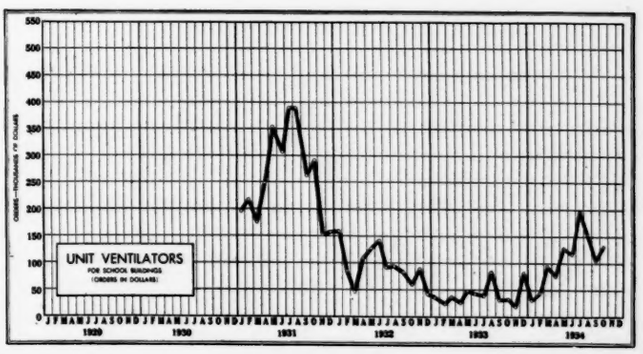
Indirect Heating Surface: An increase of 85.7% was shown in cast-iron type indirect heating surface, sales of which amounted to over $70,000 in the first 10 months of 1934. Non-ferrous surface increased 46.9%, sales amounting to $734,136 in the first 10 months. Steel pipe coil sales amounted to $25,368 for the first 10 months of 1934, which showed a gain of 173%.

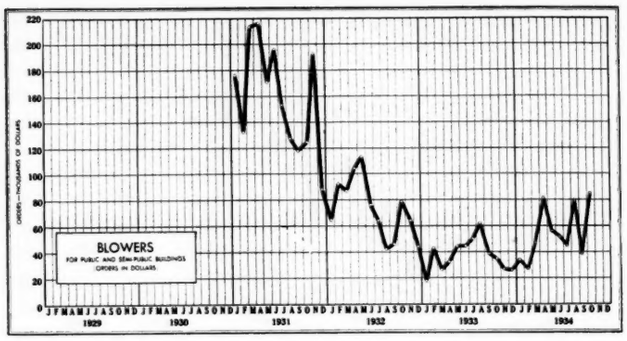
Air Washers: There was an increase of 45.8% in the sale of air washers (including pumps, motors and controls where furnished). Sales of this equipment amounted to slightly more than $400,000 in the first 10 months.

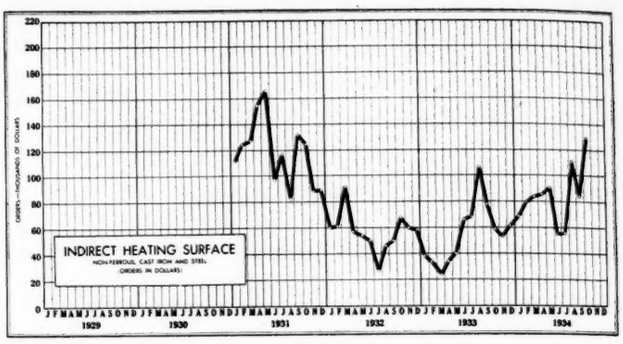
Industrial Air Conditioning Units: Approximately $1.3 million worth of industrial air conditioning units were sold during the first 10 months of 1934—an increase of 133% over the previous year.

Other Equipment: It is unfortunate for those who take a keen interest in statistics of the industry that there are still no figures available on some of the im-









portant equipments used in the industry. Air conditioning units of the room type, for instance, are one example[7]; air filters are another; warm-air furnaces are not reported in current figures[8]; refrigerating machinery sold for air conditioning runs into figures difficult to estimate[9]; humidifiers,[10] unit coolers, and indirect conditioners are sold in volumes the quantity of which it is doubtful if anyone could estimate accurately.

Prices

It is perhaps unfortunate that there are no extended indexes of prices of heating equipment, as there are for most other industries. However, there is a fair index, available through the U. S. Department of Labor, which indicates that the price of heating equipment to the contractor weakened in October, 1934, having reached its high point for the last year in April of this year, when prices were 80% of the 1929 average. The following table shows the trend of this index in per cent of the 1929 average.

1933	
January	66
April	63
July	73
October	79
December	76
1934	
February	77
May	79
August	79
October	72

It is probably true that the building industry is the hardest hit of all major industries. The table which follows indicates to some extent that the heating business may rank among the hardest hit of those in the building industry, provided price really has an important relation to supply and demand.

[7]One estimate of these was included in a total of $6,325,000 for 1933 for unit conditioners, heaters, coolers, and ventilators, all types.
[8]Estimated at $6,875,000 for 1933.
[9]Estimated $6,000,000 for 1933.
[10]Possibly these totaled $250,000 in 1933.

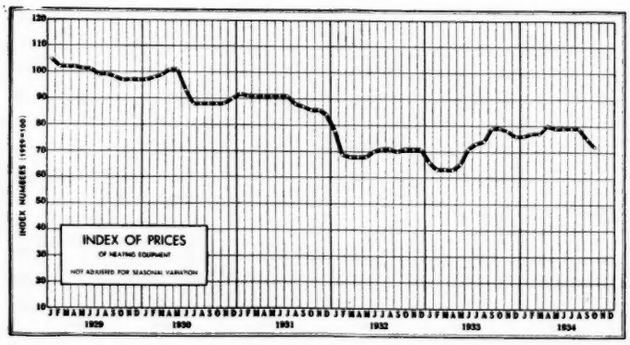
It will be noted that in the spring of 1933 the price of all commodities (784 items which make up the cost of living) had dropped to 59.8% of the 1926 average. Heating prices keeping in line had dropped to 59.4%. On the other hand, the price of all building materials had dropped only to 70.2%. With the increase in prices following the institution of NRA the price of all commodities jumped to 77.6% in 1934, and heating equipment, again keeping in line, rose to 76.2%, while other building materials had increased to 87.8%.

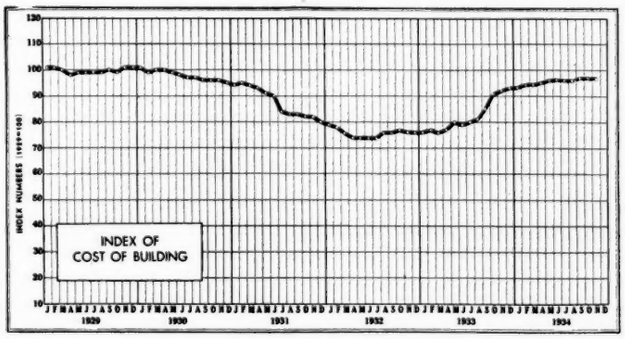
This table would lend some justification to the argument of those who claim that building material costs must be cut. The price of building materials has not kept in line with the price of commodities in general, but heating equipment has not sustained its prices at what would appear to be unreasonably high levels.

	All Commodities	All Building Materials	Heating Equipment
Index in 1926....	100%	100%	100%
Low Point	59.8%	70.2%	59.4%
Date of Low.....	February, '33	April, 1933	March, 1933
High since Jan., 1933	77.6%	87.8%	76.2%
Date of High since Jan., 1933	Sept. 1934	June, 1934	April, 1934

Employment

Sociologists and economists have long bemoaned the lack of accurate data on employment. Steps have, during the last two years, been taken to correct this. Employment statistics are, however, still by no means complete and the only record available for the heating industry is employment in plants manufacturing steamfittings and heating apparatus. The Bureau of Labor Statistics computes an index on this which shows that during October, 1934, employment in these plants was exactly at the same point as a year ago. The following table shows the trend of employment in these plants during the last two years. The figures are in per cent of 1929 levels:





1933	
January	42.5
April	46.0
July	58.2
October	60.5
1934	
January	47.9
April	50.0
July	52.7
October	60.5

Building Costs

Obviously the cost of erecting a building is made up of two separate items—cost of materials and the cost of labor. The cost of materials has increased during the past year, thus bringing up the index of cost of building. The trend of this index is shown in the following table, the figures being in per cent of the 1929 figure which equals 100.

1933	
January	76
April	77
July	80
October	91
1934	
January	93
April	95
August	96
November	97

Wage Rates

Data on wages are collected by several organizations but in general these are primarily wage scales and are not always an accurate indication of what wages are actually being paid.

The wage scale reported by the National Association of Builders Exchanges for 48 cities shows that the wage rate for sheet metal workers has remained unchanged from the fall of 1933 up to the fall of 1934 with few exceptions.[11]

There have been increases in steamfitters' wage rates, according to the twenty-second survey made by the Educational Department of the Heating, Piping and Air Conditioning Contractors National Association. The following table summarizes these wage rates:

	Nov., 1933	May, 1934	Nov., 1934
Low rate per hour	.40	.50	1.00
High rate per hour	1.50	1.75	1.70
Median rate per hour	1.03	1.00	1.23

[11]In Des Moines the rate rose to $1.12½ from $1. In Omaha from 87½ cents to $1. In Reading from 70 to 80 cents and in Rochester it dropped from $1.05 to $1.00.

The Industry and Government—FHA Takes Limelight from NRA During 1934

A YEAR ago NRA was the headline Federal agency for promoting industrial and business recovery. Now, as 1935 opens, it is forced to share the limelight, for FHA—born and reared in 1934—came along lustily in the closing months. The story of how the government shifted its attempts to promote business activity as the year progressed is largely the story of these two Administrations and their rise and fall.

Scarcely had the year started before dissatisfaction over the way things were going brought about conferences and plans on the part of NRA to break the blockade which the rapid approval of codes had helped to bring about. Early in March members of code authorities and others interested were invited to conferences at Washington to consider the situation.

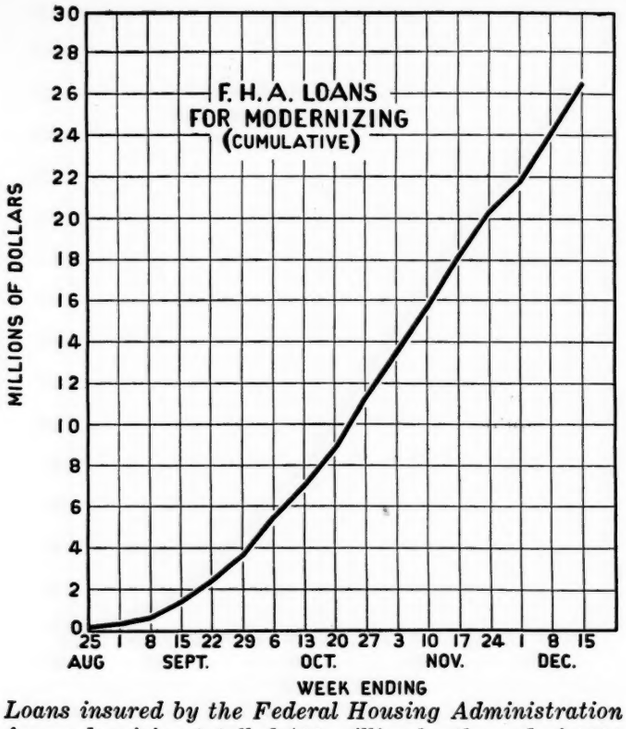
One important result of these meetings was to bring sharply into focus the fact that while NRA was perhaps helping consumption goods it had not done much for capital goods. Moreover, most of the unemployment was shown to result from the low level of activity in capital goods. Therefore, something special should be done to start things in the capital goods industries.

Still further, building construction normally employed the largest single group of all those found unemployed. Thus the problem resolved itself into a program to help the building industry.

On May 14 a plan was sent to Congress with the recommendation that it be put into effect. Following much jockeying, wrangling and with some changes the plan finally emerged in the form of the National Housing Act, and was signed on June 28. By the middle of August loans were being made for modernizing purposes and Title I of the Act was operating. Title II dealing with insurance on mortgage loans was slowly getting under way at the close of the year. Now FHA has rather succeeded NRA both in general public interest and in interest to heating men especially, for its effects are directly felt.

Effects of FHA

Title II of the Act was in operation for too short a time to permit any figures to be collected. It is doubtful if it had any direct effects at all on business during 1934. Its chief interest is the promise it holds for the present and following years.



Loans insured by the Federal Housing Administration for modernizing totalled $29 million by the end of 1934

Modernizing, however, did definitely play a part in the year's work—and an important one. So far as the FHA program under Title I is concerned the effects are illustrated in the accompanying graph. Loans insured by the end of the year totalled about $30,000,000 and with not less than 10% of this going to heating, accounts for not less than $3,000,000 worth of heating work. It is certain that the general interest stirred up by the local FHA campaigns (over 4000 were reported) caused additional modernizing work to be done, not insured by FHA. Estimates of this run as high as $150,000,000. At any rate it is evident that the FHA modernizing did originate considerable heating work.

Other Aids to Building

While FHA attracted the greatest attention of any of the Federal helps to building it was not the only one. Others were: PWA and Public Works Emergency Housing Corporation, which were concerned with housing on a large scale, principally slum clearance and low rental new construction; Home Owners Loan Corporation and Home Owners Loan Bank Board, which loaned (and then stopped receiving applications) on distressed owner-occupied dwellings. RFC which moved to help guaranteed mortgages and mortgages on commercial property; Farm Credit Administration which sponsored a move to modernize farm buildings, and Federal Subsistence Homesteads Corporation. Also the government continued to make funds available for construction of buildings for its own use—the Public Works program which resulted in contracts for such buildings being let to the extent of over $35,000,000 during the first eight months of the year.

Public Works Administration funds supplied much of the money for educational, social, dormitory, and institutional work of the year, but the expected program of slum clearance and low-cost housing did not materialize. None of these projects had been completed by the end of the year and many of the allotments made earlier were withdrawn. Subsistence Homesteads included little heating work.

NRA

When we consider NRA by itself and divorced from the other efforts of government to stimulate business we find facts which are curious to anyone who has not followed the whole story. One is that after all the haste shown a year and a half ago, there are still codes which have not been approved or otherwise acted on so far as can be determined. Others have been withdrawn, consolidated with others, removed, and suffered other fates.

In the great majority of cases the various codes were approved in due course with most of the approvals taking place in January, February, or March. Among these were the Construction Code (January 31), C. I. Radiator and Boiler Manufacturing (February 10), Fan and Blower (February 12), Unit Heater and Ventilator (February 19), Concealed Radiator (February 19), Air Filter (March 17), Refrigeration Machinery (March 17), Air Valve (March 31). As the codes were approved they carried "effective" dates and theoretically each went into effect automatically on that day.

No sooner was the attempt made to put them into effect, however, than troubles began to pile up. NRA was organized to draw up codes—not to enforce them. During March an internal reorganization of NRA attempted to rectify this. Unfortunately, legal and policy questions arose at once and could not be straightened out quickly. Code officials began to report as early as March that they were not able to collect assessments. Obviously the codes could not be very effective until money could be obtained. A rule was drawn up but an executive order to cover the situation was not issued until the middle of April, and did not get going fully until July. Thus by the time the assessment rules were ready the year was half over. Much the same is true of many of the other steps necessary to make the codes really effective.

By late August and early September there was plenty of impatience and it soon broke out in open criticism. A group of code authority members addressed a questionnaire to everybody in general, and among the questions asked was this one: "Does NRA actually expect to enforce the codes?" There was much skepticism. Shortly Johnson resigned (effective October 15.) Roosevelt went on the air on September 30 to carry his case to the public, and said "NRA will be a permanent part of government."

Boards took charge instead of Johnson. Correlation of the work was started. New policies were formulated. As the year closed decisions were by no means clear cut.

Most of the code authorities were left at the end of the year with unanswered questions, with plenty of work ahead, with some worried as to just where they stand and how long they will continue to stand, and in general in custody of a code not yet fully operating.

Aside from these general events there were several of such particular interest that their highlights are summarized here.

Engineers' and Contractors' Codes

One is the matter of the proposed code for engineers. It was drawn up promptly but just as promptly ran into trouble. Definitions were hard to state; practices were by no means uniform; wages, salaries, and fees varied greatly from city to city. Revision followed revision. Finally, late in May, the New York Society of Professional Engineers went on record as opposing any code. At the same time formation of a new national group was projected but apparently not with any idea of revising the code.

Another series of interesting events surrounded the several contractor codes. Grouped under a general code for the construction industry which was approved in January and effective in March, the contractor codes were put into operation one by one. Agreement on this procedure was obtained only after a long debate. Momentarily after approval of the general code, approval of the divisions was expected. In the case of the heating contractors, however, approval was obtained only on July 25 and with an effective date of August 9. Following this, approval of the code authority personnel was obtained, regional and local boards were designated, as were bid depositories, headquarters established, and by the year-end the work of the authority was moving as smoothly as could be expected.

Throughout the negotiation of the contractor codes there were numerous difficulties to be ironed out. These were probably more acute than found with other groups because of the nature of the business. Most troublesome were questions of jurisdiction, of trade practices including price setups, and of labor relations, especially wage rates. By no means all were able to agree that contracting is a separate function. Some manufacturers felt that installation and service were naturally to be kept in their own hands. Other groups did not want to be governed by rules which called for a high minimum wage rate. Approval of the code carried the provision that the definitions of what work it was to cover were to be opened for hearings. At the hearing held November 8 in accordance with this provision, numerous oral protests against the existing wording were made, and additional briefs were filed. The code authority defended the code as written. At the year-end no decision had appeared.

Originally it was expected by those who drew up the NIRA that there would be only a few master codes with many minor ones grouped under these. As this expectation failed with the filing of hundreds of codes, there have been those who have held that smaller code groups should combine or consolidate. An attempt to work out such a consolidation among the equipment groups in heating and air conditioning was made early in the year. Following preliminary meetings to sound out sentiment and preparation of a proposed organization chart and tentative master code, little further progress was made. In the closing months a new move along similar lines was made. This resulted in meetings of those interested during November. Committees were formed to study means, and so the matter stood as the year closed.

The Oil Burner Code

One of the first codes approved was that for the oil burner group. It was frankly vertical in form and covered the fair practices from manufacture through sale and to operation and service, and included burners for domestic, power, and process purposes. At the beginning of 1934 its code authority was organized and going. Things looked fine, for an accounting system had been drawn up, regional groups among dealers had been formed, statistical studies were being made, complaints were being adjusted, and the authority had funds. At the April convention of the American Oil Burner Association reports from the authority were optimistic.

There were rumblings, however, and a group which opposed the whole program. On May 8 the situation broke into the open when a public hearing was held. It was claimed that the assessments made by the authority were illegal and uncollectable; that costs were too high, and that industrial burners should not be included under the code. In June revision of the existing code was asked by NRA. A new code authority was called for by the revised code, the former one disbanded. Effective October 1 a new authority took office and since then has continued to function on a new budget. This is one of the few cases, if not the only one, where such action toward a code or a code authority has been taken. Its full results are not yet capable of evaluation.

Chicago Architectural Photographing Co.

One of 1934's outstanding air conditioning installations — 387 units with a 600-ton steam jet — in the Chicago Tribune Tower

Trade Associations in 1934

TRADE associations continued in the state of change which was started when NRA appeared on the scene a year and a half ago. Since then code activities have occupied much of their attention. As the year closed it was not yet fully evident just what the immediate future holds. Substantial changes in the National Recovery Act are fully expected but their nature is still being debated.

During the year the form of organization for code administration became well standardized with the Code Authority set up as an organization distinct from the associations themselves. This places the associations in the position of controlling the authority organization but without being the same legal body. It is to be expected that shortly the associations will return to programs and activities more nearly like those which occupied them before NRA appeared.

The code situation is still difficult to follow. Details are hard to get at and really reliable statements of just how things stand in the administration of most codes are lacking. Because of this, the following statements give but little attention to code activities and outline instead the activities of the associations as they relate to other matters.

Depressed business made it necessary for virtually all of the established associations to continue to operate on reduced funds; to be careful in their planning. Nearly all continued to pay attention to original research although only a few were able to do much with it. Nearly all continued to offer educational material of various kinds to members.

Heating and Piping

The Heating, Piping and Air Conditioning Contractors National Association reports that the year 1934 was full of activity and achievement. Highlights in the program for the year were the acceptance by NRA of its code, the attainment of an all-time high point in its membership record, and progress in the maintenance and strengthening of the position of its members in the distribution of heating, piping, and air conditioning equipment.

The NRA code became effective on August 9 and is administered by a Divisional Code Authority of 11, seven of whom are representatives of the association with four representing non-members.

About the middle of the year an all-time high point in association membership was reached and passed. Membership continues to grow. Heating, piping, and air conditioning contractors, as never before, recognize the necessity of affiliating with their association.

More and more, manufacturers are recognizing the benefits to be gained by a program of strict cooperation with the contractor in the sale of all heating, piping, and air conditioning products, not only from their standpoint and the standpoint of the contractor, but also from the standpoint of the best interests of the ultimate consumer.

In connection with a program of assisting the members, the series of air conditioning lessons, started in 1932, was completed during the year. The lessons as now constituted are made up of five parts—a total of 18 lessons.

The association looks to the future with hope. Some renewed building activity in connection with the new construction phase of the FHA program is expected but it is believed that the emphasis for some time to come will be upon the modernization phase.

Warm-Air Heating

For 15 years the National Warm Air Heating and Air Conditioning Association has financed the work in its research residence at Urbana. This work has come to be one of the principal activities. It was active throughout the year and bids fair to be continued indefinitely. Closely related is the standard installation code. This is kept closely in line with the research findings and was modified slightly during the year. In addition the association cooperated in NRA code activities and with the FHA.

Building Owners and Managers

Aside from legislation and code activities the National Association of Building Owners and Managers continued its periodical publication throughout the year and also its surveys of rental conditions and its experience exchange. The surveys form good indication of how things are going in the commercial building field. In October the survey showed a small increase in the occupancy of these buildings. This may be taken as a hopeful sign. The experience exchange report showed that the average operating cost of heating and ventilating plants in commercial buildings was slightly lower than during the preceding year. It is thought that some of this decrease is due to the increasing use of heating control systems on such buildings, many of which have been modernized to include control. Air conditioning, especially the economic phase, continued to attract the interest of members.

Electric Utilities

Activities on the part of associations composed of electric utility companies or those in which these companies are potent were varied enough to call for separate description.

Edison Electric Institute, operating through committees, is reported to

be giving careful and comprehensive study to the whole subject of air conditioning as it affects the interests and policies of these companies. During the year a subcommittee presented a report giving statistical summaries, some market data, and suggested program to be followed by operating companies. The Institute work is continuous and reports are presented as various phases are completed. The other national association of electric power companies is supporting the tests being made on the air conditioning equipment now on the market. These are performed in a special laboratory built for the purpose.

A whole string of associations organized locally to promote air conditioning and the sale of air conditioning equipment began to appear during the year. The local electric utility company was usually the prime mover in getting these organizations started and also gave active support and encouragement to them after organization. Details vary from city to city but the usual organization is composed very largely of equipment dealers and utility employes. In some cases membership is open to anyone interested. Air Conditioning Bureau is the most-used name for these organizations. In other cities an air conditioning division of the existing Electrical League, or Electrical Bureau, is carrying on essentially the same function as the air conditioning bureaus organized separately.

Associations of this kind, it will be recalled, have been used to promote the popular acceptance of electric power and the sale of electric appliances. Some proved very helpful, while others developed practices which were at least questionable. There is no question that well-operated local bureaus can be made extremely useful in promoting acceptance and use of air conditioning.

At present the program of each bureau usually includes a plan for promoting personal acquaintances, preparation of prospect lists, some form of local cooperative advertising, and the collection and mutual use of a certain amount of technical information including design temperatures to be used in preparing estimates.

These bureaus may now be said to be in the formative stage and their record for 1934 consists largely of organization, preliminary meetings, and early steps necessary to get their full program under way.

In spite of these activities on the part of national associations and the appearance of new local groups, the year cannot be said to have brought forth any indication that the electric utilities as a group are of one mind about the subject of air conditioning. There was indication though that the local aspects of the problem are being more clearly appreciated.

Gas as a Fuel

Gas for space heating continued along a steady course in the natural gas districts with little of outstanding interest occurring during the year. In the manufactured gas areas, however, there was greatly increased activity in some cities and a rather general movement to set up rate schedules intended to make gas heating attractive. In numerous cities gas for heating is now available at 45, 50, or 55 cents per 1000 cu. ft. As the year closes there is every indication that this movement toward lower gas rates will be extended generally.

The cities of Chicago, Washington, Baltimore, and Albany were especially active and successful in encouraging the use of gas for heating. Only slightly less so were Boston, Philadelphia, and the territory (in Michigan) served by Consumers' Power Company. In these cities the trend toward using conversion gas burners is reported to be marked.

The year also saw the sale of gas for heating become much more of a regularly organized activity, and a spread of the idea of applying typical utility sales methods to it. In some places it is beginning to take on the aspects of appliance merchandising in a more marked degree. There were no notable changes in installation policies, and no especial shifts in selling practice.

Under the auspices of the committee on house-heating of the American Gas Association a series of booklets was issued during the year which summarized much of the experience gained in promoting, engineering, and selling gas and the necessary equipment. These bulletins are intended especially for gas utility employes and set up the advantages of gas and illustrate arguments used in its favor.

Efforts were continued to find and develop commercially suitable means of using gas to power the summer cooling of air, with silica gel still appearing to be the most promising means. New equipment for this purpose is in course of preparation. In addition, operating results on those installations now in existence continued to be collected and studied.

The laboratory maintained by the association issued a series of standards on test procedures developed and accepted by cooperative agreement, and also continued its established work on appliance testing.

Bituminous Coal

Tonnage of soft coal produced for all uses during 1934 was nearly 10% greater than during the preceding year, but there is no way of knowing how much went for use under heating boilers and whether or not the 10% carried over into this use. Prices also stabilized and generally the delivered cost per ton was greater than in 1933. Although the price of fuel oils also rose during the year, the bituminous industry was emphatic in its protests against an NRA code situation which it claimed upset the competitive fuel situation greatly. Proposals for in-

creased freight rates also entered as a threat against the use of coal, especially in the New England states. The National Coal Association found it necessary to devote much of its program for the year to these problems as they arose.

In spite of the necessity of keeping attention on competitive problems, the industry plan of a great research organization was realized when officers of Bituminous Coal Research, Inc., were elected in October. Sufficient funds are reported in hand to enable the new corporation to start its work, with enough additional in sight to give promise of a great development.

Anthracite Coal

Production figures on anthracite are not available. However, the tonnage figures were reported during the early months of the year as being better than for corresponding months of the year before.

Anthracite Laboratory continued its established work as a place for investigating and studying ways of increasing the efficiency of using anthracite.

Enough users of the proposed standard for anthracite domestic burners adopted the findings of a committee which drew up standards in tentative form, so that the tentative standard was published by the Department of Commerce as a Commercial Standard. This is only one phase of the cooperative work under way between the laboratory and the department. Others continued to make progress during the year.

Oil Fuel

While complete figures are not yet available it seems certain that 1934 will compare favorably with the preceding year in the total number of oil burners produced and sold. Price rises for the fuel were disconcerting but conditions steadied in the closing months.

In April the American Oil Burner Association held its annual convention and show at Philadelphia. The convention was widely attended while the show was generally conceded to rank with any preceding.

So far as AOBA is concerned, the year was featured by the unfortunate and ill-understood events which led to the breakdown of the NRA code originally sponsored by it at the urgent appeal of the Administration for cooperation.

1934 saw the revival of the Oil Heating Institute for disseminating information to the public on oil heat and for promoting the interests of the industry at large. Although no definite action was taken during the year, machinery was set in motion to make the AOBA a member division of the National Electrical Manufacturers Association.

Near the close of the year there was formed the National Oil Burner Dealers Association. Its program is expected to supersede the work heretofore done by the dealer division of AOBA, but the older association expects to maintain a close and sympathetic interest in the progress of the newly organized group.

During the closing months of the year the manufacturer members of AOBA have turned attention to how best to organize to meet new conditions. Committees scheduled to report at a meeting in Detroit early this month are expected to make recommendations on a future course.

Other Groups

The Refrigerating Machinery Association reports satisfactory progress in standardization in its field during 1934. This group was concerned last year with new technical developments in the field of commercial and industrial refrigeration, in government policies affecting the durable goods industries, and the possibilities in the export markets.

One accomplishment of the Institute of Boiler and Radiator Manufacturers in 1934 was the setting up of a clearing house for checking on future delivery contracts in order to enable the manufacturers to do away with such of these contracts as are illegitimate. Neutral agencies were set up to check these contracts and an itemized report is filed on each. In addition, these manufacturers require buyers to accompany their future delivery contracts with a $2 fee.

Reorganization of the Plumbing and Heating Industries Bureau was one of the year's events. Full responsibility for future policies and financing of this organization was placed in the hands of the Bureau's member associations, manufacturers, wholesalers, and contractors. The old organization, organized in 1919, was dissolved and its assets transferred to a new corporation. The purposes of the newly organized bureau include the maintaining of publicity and information bureaus; development of a wider knowledge and a better understanding and appreciation of the products of the heating, plumbing, and air conditioning industries, and promotion and encouragement of harmonious relations between members of the association and the public.

Midsummer saw the formation of the Unit Air Conditioner Manufacturers Association, organized to formulate a code and for other purposes. At the end of the year it was announced that its code would be administered through the Refrigerating Machinery Institute. The Association plans to continue its other activities.

The ice industry maintained its interest in the air conditioning field during the year. At its recent annual meeting the National Association of Ice Industries reported progress in the number of such installations and looked forward to increased activity in comfort cooling with ice.

Although not strictly a trade association activity, the work of standardization has continued during 1934. A proposed American standard for pressure and vacuum gauges was completed and may be adopted during the coming year. A simplified practice recommendation for steel heating boilers was also prepared and possibly will be adopted during the coming year.

The Concealed Heater Manufacturers Association completed a major accomplishment during the year in that all member manufacturers had their concealed radiators tested and rated in an independent laboratory. The Industrial Oil Burner Manufacturers Association succeeded in establishing itself under a code separate from the regular oil burner industry, as did the distillate burner makers.

Heating and Ventilating

NEW EQUIPMENT IN 1934

With sales volume on the increase, 1934 did not see any corresponding increase in the number of items of new equipment offered on the market. This may have been due to greater emphasis on actually making sales instead of revising lines and products. During the year with business improved there was more reason for concentrating on selling. Also the previous three or four years had seen a rather surprising flow of new products to the market. The past year possibly saw the end of this. Moreover, there is reason to believe that the development stage in air conditioning equipment is rapidly drawing to a close. For the second consecutive year there was a decline in the number of new products brought out.

In the following pages are listed most (but not all) of the new products which were announced during 1934. Some selection was necessary in preparing the list. As it stands, enough products are included to permit forming a correct idea of the nature of the year's products. For convenience in finding particular items they have been arranged into five major groups.

AIR CONDITIONING AND VENTILATING EQUIPMENT 32

Includes: unit and central conditioners of all types; humidifiers; window and attic ventilating sets; unit heaters and ventilators; air filters of all kinds; refrigerating machinery; finned heat transfer surface; fans and blowers, and special motors.

FUEL-BURNING EQUIPMENT 38

Includes: oil-burning devices—conversion burners, boilers, boiler-burner sets; coal-burning devices—stokers, boilers, and stoker-boiler sets.

STEAM AND HOT WATER SPECIALTIES 40

Includes: boiler return traps, water feeders, pumps, steam traps, hand-operated valves, radiator air valves and traps, pipe fittings, hot water circulators, boiler accessories, expansion joints, and air eliminators.

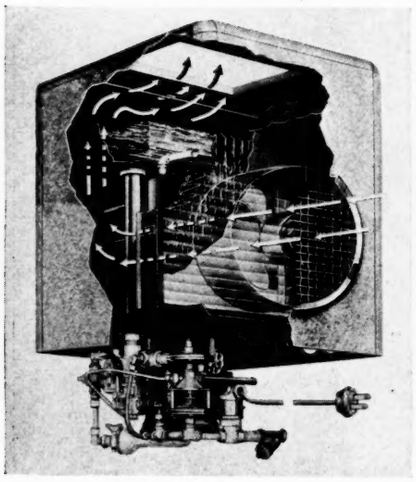
CONTROLS, INSTRUMENTS AND MOTORS 43

Includes: operating, measuring, or controlling devices of all kinds; also electric and air motors.

OTHER EQUIPMENT 47

Includes belting and insulation.

Air Conditioning and Ventilating Equipment



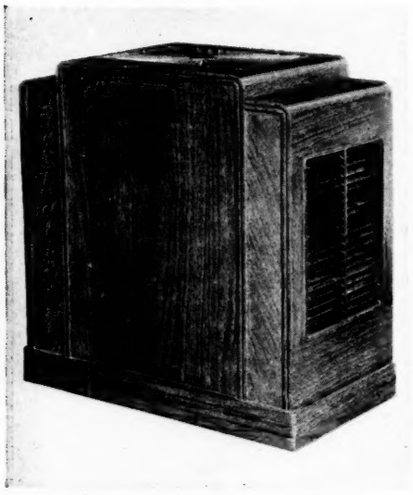
PRODUCT—Humidifier-heater.

PURPOSE—To make winter humidifying practical at reasonable cost in homes with gas service.

FEATURES—Designed to be hung from basement rafters, with distributing duct leading to outlet grille on floor above. Consists, essentially, of blower; removable screen filter washed by warm water; gas-burning heater with surrounding air chamber and controls. Cabinet is delivered complete ready for installation.

CAPACITY—Ample for supplying humidity to most residences.

MANUFACTURED BY—The Bryant Heater Co.

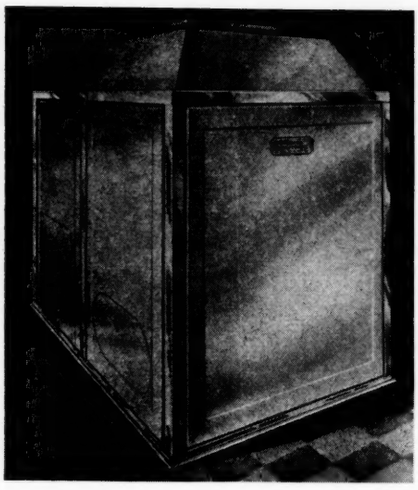


PRODUCT—Air conditioning units.

TYPES—Floor, wall, suspended and portable.

CAPACITIES—Floor and wall type, 7500 and 15,000 B.t.u. per hr., cooling; portable type, 4200 B.t.u. per hr., cooling; room conditioners, 7500 and 15,000 B.t.u. per hr., cooling.

MANUFACTURED BY—General Electric Co.



PRODUCT—Air conditioning unit, warm-air type.

FEATURES—Heats, cleans, humidifies, and circulates the air. Has air-cooled jacket, metal frame, 16-gauge steel panels. Radiator is of welded steel with ground joint connections to combustion chamber, which is one piece. Humidifier is gravity vaporizing type, electrically controlled. Equipped with Gilbarco Model S-1 oil burner.

SIZE—53 × 67½ in. in plan, 66 in. high.

CAPACITY—150,000 B.t.u. per hr.

MANUFACTURED BY—Gilbert and Barker Mfg. Co.

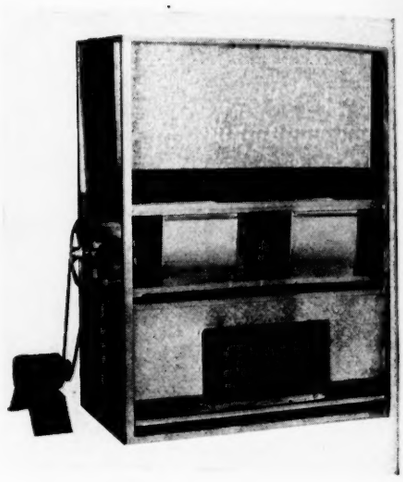
PRODUCT—Air conditioner.

PURPOSE—Winter and/or summer air conditioning.

TYPE—Indirect type, with blower, filters, mechanical refrigeration, heating coils, for connecting to boiler. Uses ducts for air distribution from basement. Available in two models, Series H for winter conditioning, Series CH for year round use. Latter has refrigeration, former does not.

SIZES AND CAPACITIES—Series H—4 sizes, 107,000 to 312,000 B.t.u. per hr.; Series CH—with 4 sizes refrigerating machines, 24,850 to 62,100 B.t.u. per hr. cooling capacity.

MANUFACTURED BY—Electrol Inc. (Built by American Blower Corp.)



PRODUCT—Air conditioning unit, indirect type.

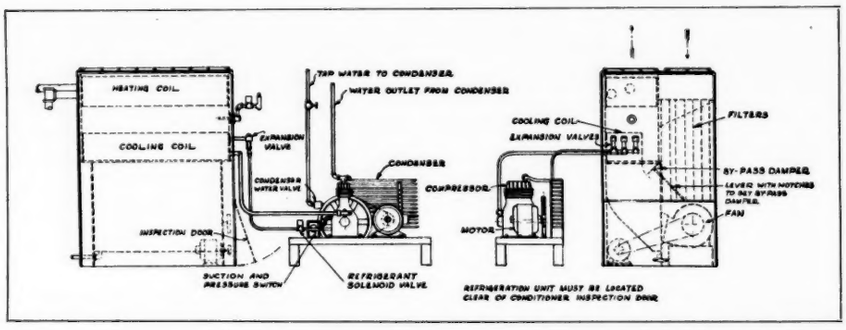
PURPOSE—Air conditioning in connection with steam or water systems.

FEATURES—An extended surface heating coil is provided in top of unit which is connected to boiler. A cooling coil is placed at angle below heating coil. The blowers are mounted in middle of unit, below which is humidifying chamber. Filters are of wool throw away type. Unit is enclosed in casing with black ripple finish and silver corner strips. Built in three sizes, each with various capacities and with various functions.

MANUFACTURED BY—Dail Steel Products Co.

PRODUCT—Air conditioning units, room type.

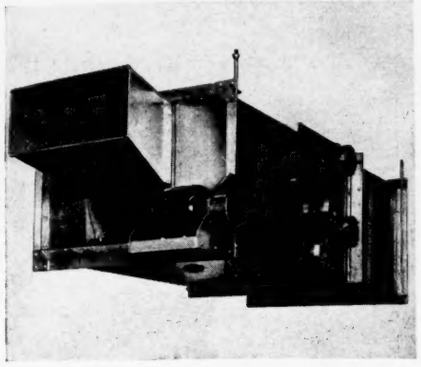
FEATURES AND CAPACITIES—Line of units for cooling, heating, humidifying, and circulating air. Available in 12 finishes. Aluminum extended surface with cooling capacity of 200 B.t.u. per min., when circulating 50° water at 30 lb. per min., with air volume at 600 f.p.m., and entering air at 80° dry bulb, and 50% relative humidity. Heating capacity of unit is 240 sq. ft. of steam. Piping connections include ½-in. copper tubing for spray line; ½ in. for steam inlet and condenser outlet; ½ in. water inlet, and water discharge. Two double 6-in. blow-



ers are used. ⅛-hp. Emerson motor drives fan. Spray nozzles deliver 1½ lb. of water per min., at 2-lb. pressure.

A line of freon condensing units up to 15 tons capacity is available in two types, one using refrigerant to chill water which is circulated to room units and other for circulating refrigerant directly to evaporator coil in unit.

MANUFACTURED BY—Temperature Corp.

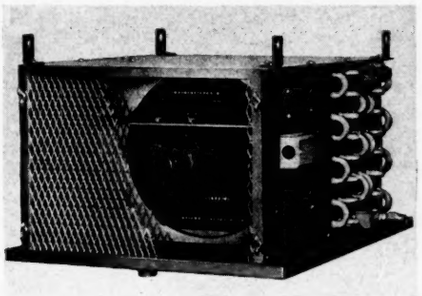


PRODUCT—Air conditioner, Type C.

PURPOSE—Type C for complete summer and winter air conditioning of stores, restaurants, offices, and assembly rooms. Types D and M, for cooling small shops, restaurants and offices. Type A, for precise control applications in process industries.

CONSTRUCTION—Type C, made of aluminum and intended for ceiling suspension. It requires connections to steam, refrigerant or cold water, electricity, and a drain. Types D and M, ceiling suspension type, distribute cold air directly without ducts. They can use any type refrigerant, require connection to electric socket. Casing, fan, louvers, and eliminators of bright aluminum. Type A, is capable of maintaining constant temperature and humidity conditions over wide ranges.

MANUFACTURED BY—Niagara Blower Co.



PRODUCT—Cooling unit, Type XBC.

FEATURES — Mounted on heavy stamped frame with electric welded corners and furnished with drip pan and heavy support end plates. Fan shroud and guard easily removable. Tapped hole is provided for draining condensate and motor is of ball-bearing type with simple mounting facilities.

MANUFACTURED BY—Young Radiator Co.

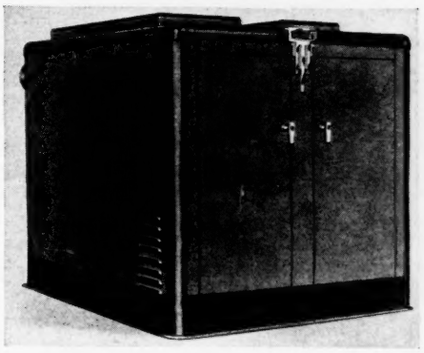
PRODUCT—Air conditioning units.

TYPES AND CAPACITIES — Floor-type conditioners available in Types K and L, former a ½-ton unit, latter a one-ton unit.

Ceiling-type conditioners in two styles, one in three sizes with cooling capacities from 24,000 to 72,000 B.t.u. per hr. and heating capacities from 78,000 to 234,000 B.t.u. per hr. Other in eight sizes with capacities from 450 to 1700 c.f.m.

Compressor unit available in a line uses methyl chloride as refrigerant, has shell and tube-type condensers, operates on suction pressure of 28 lb. The line covers 10 sizes with capacities from 6,000 to 18,000 B.t.u. per hr.

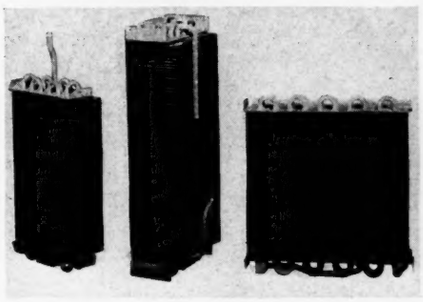
MANUFACTURED BY—Kauffman Air Conditioning Corp.



PRODUCT—Air conditioner, warm-air type.

FEATURES — Humidifies, heats, filters and circulates the air. Finished in a green furniture-steel cabinet with chromium trim. Automatic controls include thermostat, protectorelay, airstat, furnacestat, and summer switch.

MANUFACTURED BY—Delco Appliance Corp.

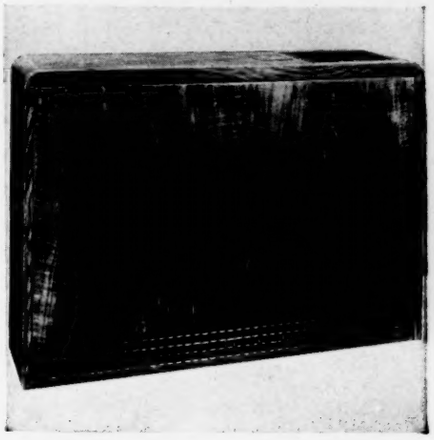


PRODUCT—Extended surface.

PURPOSE — For condensers, evaporators, other heat transfer surfaces.

FEATURES—Three types, all having different tube diameters, fin spacing, and construction. Joining is by silver-soldering, soft-soldering, and brazing, depending on service. Aluminum fins can be used where specified and where weight is primary consideration. Available in wide variety of tube diameters, fin spacings, and construction.

MANUFACTURED BY—Young Radiator Co.



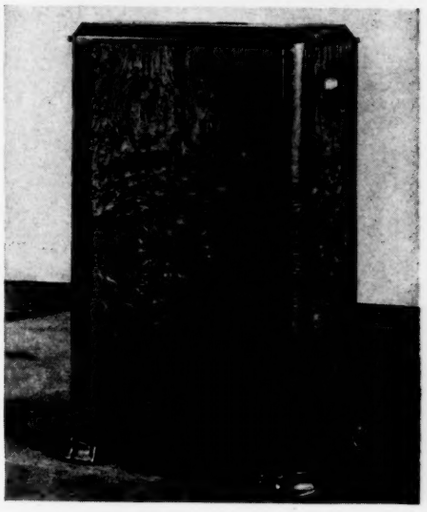
PRODUCT—Air conditioning room unit—Zephyr Model 60.

FEATURES — Equipped with two-cylinder compressor and a water-cooled condenser of double coil type. Heating not included as standard but on order unit will be furnished with copper fin heating surface below air discharge. Humidification obtained by washer.

SIZE—32 in. high, 48 in. wide, 17 in. deep.

CAPACITY—7000 to 9000 B.t.u. per hr., cooling. 40 sq. ft. of radiator heating. 4 to 16 g.p.h., humidifying.

MANUFACTURED BY—Savage Arms Corp., Air Conditioning Div.



PRODUCT—Air conditioning unit, room type.

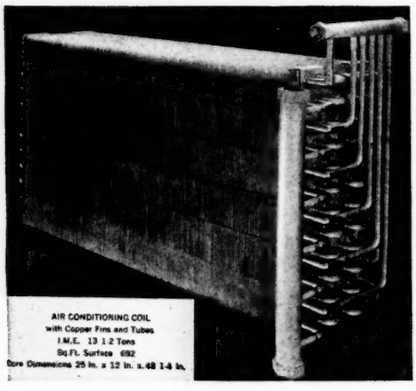
FEATURES—Three models. First provides cooling, cleaning, circulation, and dehumidifying for offices or residences. Second similar, but double capacity of first. Third functions year round, cooling, dehumidifying, cleaning, and circulating in

summer; heating, humidifying, cleaning, and circulating in winter. This unit has facilities for bringing in outside air and is equipped with filters. The unit connects with regular steam heating system.

CAPACITY—⅜, ¾, and 2/3 ton, respectively.

PRICE—$340, $495, and $583, respectively.

MANUFACTURED BY—Frigidaire Corp.

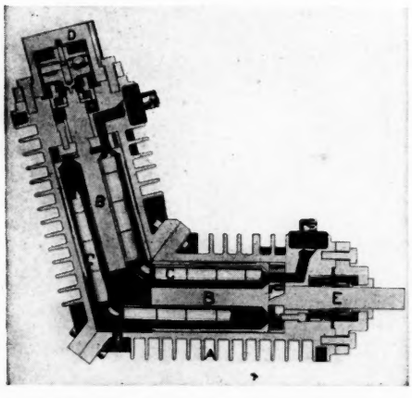


PRODUCT—Heating and cooling coils

FEATURES—For use in all types of air conditioning apparatus. Available with either flat or corrugated copper fins. Copper fins and tubes are joined with fused metal-to-metal bond. Available for use with all standard refrigerants.

MANUFACTURED BY—Fedders Mfg. Co., Inc.

REFRIGERATING MACHINERY



PRODUCT—Refrigerating compressor.

CONSTRUCTION and OPERATION—Eight-cylinder compressor with no piston rings, piston pins, crankshafts, connecting rods, gears, cams, or valves. Compression cylinders bored in cylindrical blocks B, 4 cylinders being bored in each block. Pistons C forged in pairs and placed in compression cylinders in the block B which in turn are placed in outer cylinders A. Power is applied to shaft E direct connected to compression cylinder block B which revolves in stationary cylinder A. As B revolves, it carries pistons C around with it and at same time downward moving pistons are forced to move out of cylinder B leaving a space for the refrigerant. The upward moving pistons are forced back into cylinder compressing gas. Operation of second compression cylinder block, which is at an angle to first, is same except that power for rotation is transmitted through the pistons.

MANUFACTURED BY—Thermal Units Mfg. Co.

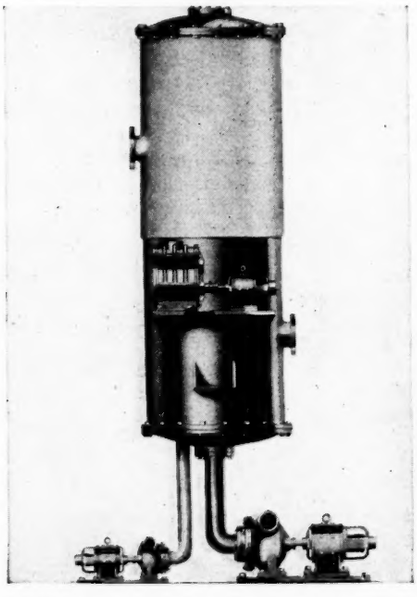
PRODUCT—Ammonia compressor.

PURPOSE—Refrigeration.

CONSTRUCTION—Suction valves located in top of pistons, and discharge valves operate in easily removable safety head, providing maximum valve areas. Main stop valve, pump-out valve, safety valve, and starting bypass incorporated in a self-contained manifold furnished as part of complete unit. Tapered rollers are used in main bearings, straight roller type used in outboard bearing. Drive can be either direct-connected with synchronous motor, or through multi-V-drive.

CAPACITY—1 to 100 tons.

MANUFACTURED BY—Worthington Pump & Machinery Corp.



PRODUCT—Steam jet cooler.

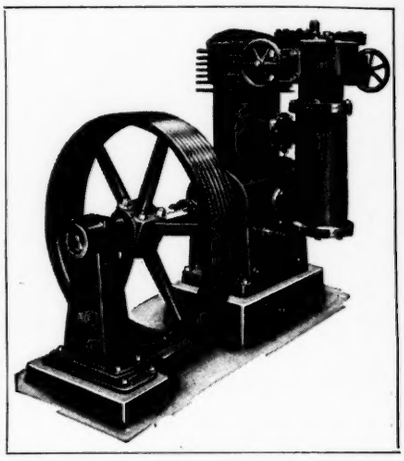
PURPOSE — Supplying cooled water for air conditioning systems and for drinking purposes and other applications where water cooled from 40° to 50° is desired.

CONSTRUCTION—Within the tank is low-pressure evaporating compartment, compressor of steam-jet type, and condenser. Exterior of tank has one pump for removing and circulating cooled water and another pump removes condensing water from condensing compartment. An auxiliary vacuum pump maintains a moderately reduced pressure in condensing compartment. Unit is unusual in that it is made in small sizes.

SIZE—Can be installed in space 3 ft. square and 8 ft. high.

CAPACITY—3 sizes, up to 15 ton of refrigeration.

MANUFACTURED BY—Elliott Co.

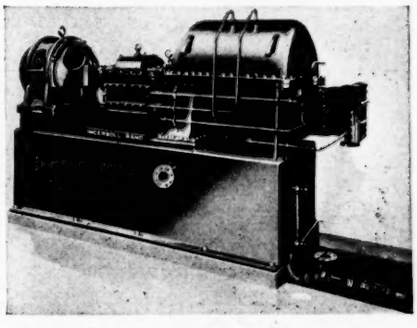


PRODUCT—Refrigeration compressor

FEATURES — Furnished with twin vertical cylinders, single-acting. Plate-type valves used for suction and discharge. Force-feed lubricating system; oil pump is located in bottom of crankcase and is driven by internal chain from crankshaft. Either V-belts or direct synchronous motor drives used as standard.

CAPACITIES—15 to 300 tons.

MANUFACTURED BY—Frick Co.



PRODUCT—Centrifugal water vapor refrigeration unit.

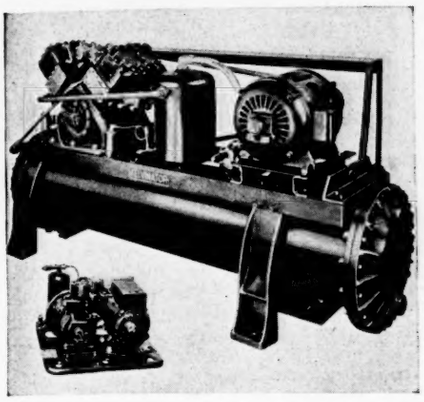
DESCRIPTION — Unit accomplishes same purpose as steam jet refrigerating machine. Evaporator is built into the base of the machine, water being admitted under return pressure and removed by a chilled water pump, as with the steam jet machine. The water vapor is compressed by multi-stage centrifugal compressor mounted directly above evaporator and is discharged into a surface condenser bolted directly

to the compressor discharge nozzle.

Power requirements are approximately 1 hp. per ton or less. Direct-drive turbine units especially are applicable where a limited amount of low-pressure steam is available because they will operate condensing when using the discharge water from the vapor condenser to condense the turbine steam. Has feature of automatically reduced power consumption at partial loads when operating at constant speed.

CAPACITIES—50 to 300 tons.

MANUFACTURED BY—Ingersoll-Rand Co.



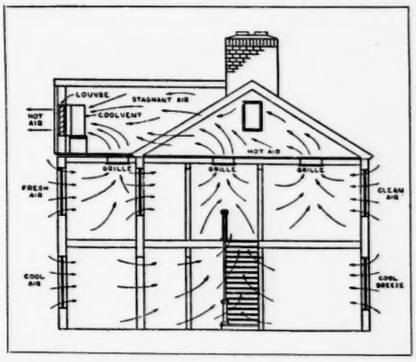
PRODUCT—Refrigerating units for air conditioning.

FEATURES—Three types: floor, self-contained, and suspended. The floor, self-contained, and eight of the suspended-type units may be equipped with heating coils and humidifying sprays for winter and summer air conditioning. Six models, in self-contained type, have all apparatus in one cabinet, designed for small offices and single rooms. Floor unit is for medium-sized offices, small retail stores, and restaurants. Used with remote condensing units. Suspended units for large offices, restaurants, stores, where floor space is at premium. For connection with a remotely-located condensing unit.

CAPACITIES—½ to 20 tons, in 16 sizes.

MANUFACTURED BY—Kelvinator Corp.

AIR MOVING EQUIPMENT



PRODUCT—Attic ventilator - Coolvent

PURPOSE—To pull air from downstairs floor up through attic and down to outside at night, thus cooling off house.

CONSISTS OF—Propeller fan with motor and square casing for installation in attic.

ARRANGEMENT—One with a single grille in ceiling and connected to fan immediately above. A second arrangement is to locate fan unit at an attic window and connect it between the unit and grille with noise-absorbing material. Several grilles can be used in attic floor to pull air through from second floor.

SIZES AND CAPACITIES—4 sizes, capacities from 1/5 to ½ hp.

MANUFACTURED BY—Autovent Fan & Blower Co.

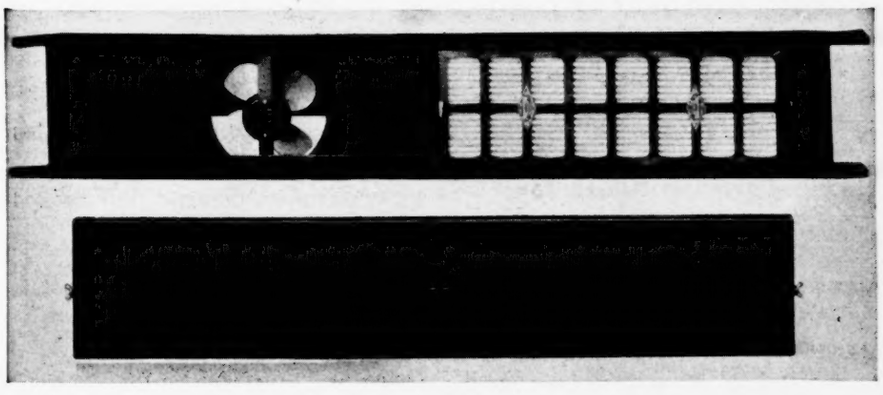
PRODUCT—Window ventilator unit.

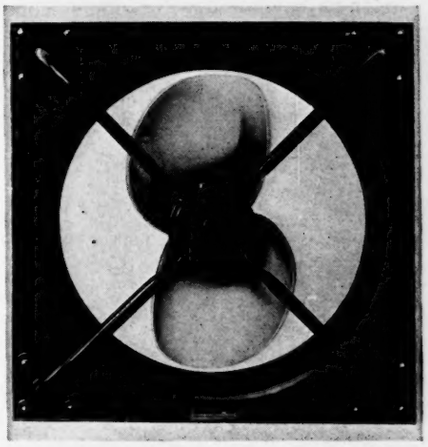
PURPOSE—For cleaning, ventilating and silencing. Can be installed in any vertically-sliding, double-hung window.

CONSTRUCTION—Filter is of Staynew Multi-V-type, using a cotton medium. Fan is of aluminum, capacity 200 c.f.m. An adjustable air deflector controls direction and volume of air flow and dampens outside noises.

SIZE—Units are available for a wide range of window sizes, in one-, two-, and three-fan models.

MANUFACTURED BY—Staynew Filter Corp.





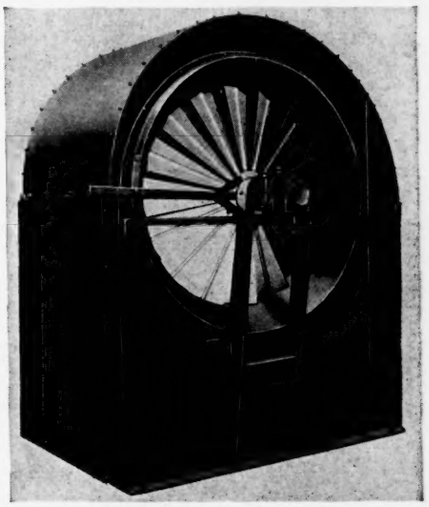
PRODUCT—Propeller fan—Ventura.

CONSTRUCTION—Blade is epicycloidal in shape. Fan has a streamline inlet which also acts as discharge outlet. Motors are suspended in steel spring mounting to absorb vibration and electrical hum.

Fans are built with die-formed furniture steel square panel finished in green or gray. Motors are two-speed, totally enclosed and furnished with two-speed controller.

SIZES AND CAPACITIES—8 sizes, 965 to 15,500 c.f.m.

MANUFACTURED BY—American Blower Corp.



PRODUCT—Vortex control.

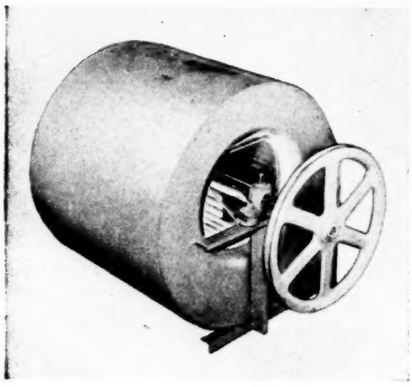
PURPOSE—Use in connection with air handling or air conditioning system when desired to periodically or continually change volume of air delivered by fan.

OPERATION—Device is placed in fan inlet and imparts rotary motion to incoming air. It reduces volume of air handled by reducing relative speed of fan wheel with relation to air entering fan. By moving blades of control fan operating at constant speed is given characteristics of fan operating at variable speed, and fan characteristic becomes same as system characteristic. Savings are claimed in operating costs due to lowering of power consump-

tion as compared with damper control method, while first cost is reduced below cost of variable speed motors.

TYPES—Two, one adjustable, one stationary.

MANUFACTURED BY—Clarage Fan Co.



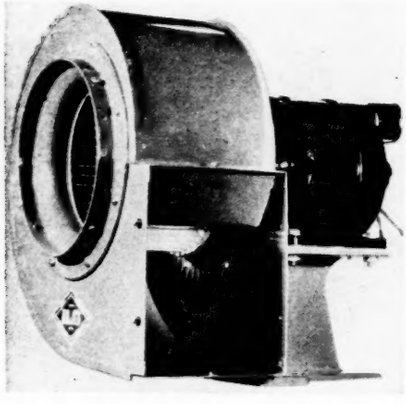
PRODUCT—Furnace blower.

PURPOSE—Forced warm-air heating systems.

FEATURES—Scroll casing designed for quiet operation. Low speed wheel in rubber-mounted, self-aligning bearings. Bronze bushings, requiring one oiling per year.

SIZE—Four sizes.

MANUFACTURED BY—Air Controls Inc., Div. of The Cleveland Heater Co.

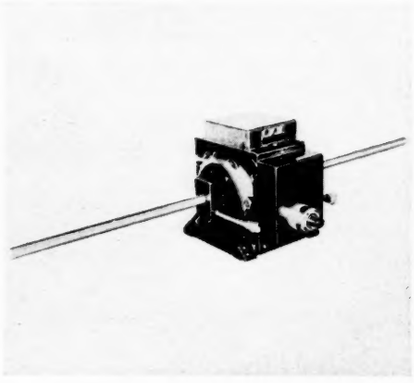


PRODUCT—Blower, Type B.

FEATURES—Steel housing is press-formed and mounted in cast-iron base. Inlet flange is cast iron. Multiblade wheel is die cut and mounted directly on shaft of motor which is placed on cast-iron base. Wheel is dynamically balanced. Motors can be supplied for any common commercial voltage, a.c. or d.c., single or three phase.

SIZES AND CAPACITIES—5 sizes, different speeds, 180 to 2100 c.f.m., static pressures to 1½ in.

MANUFACTURED BY—Ilg Electric Ventilating Co.



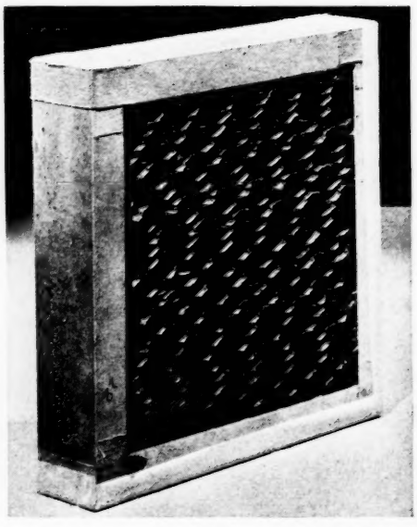
PRODUCT—Motor, long shaft type.

PURPOSE—For direct drive of multiple fan and blower units.

TYPE—Low speed, fractional horsepower, single phase, variable speed, capacitor motor. Mounted on all-metal resilient base.

MANUFACTURED BY—The Holtzer-Cabot Electric Co., Div. of The Gamewell Co.

FILTERS



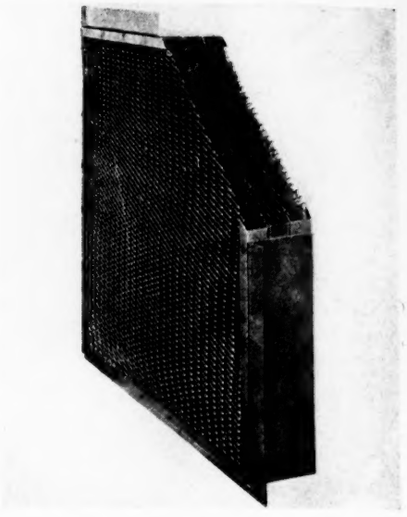
PRODUCT—Air filter.

PURPOSE—Replacement type for furnace and commercial applications.

CONSTRUCTION—Composed of two wafers of corrugated paper strips, laminated to form tubular passages. The wafers are placed in frames so that these passages are at 90° to each other, with space intervening, so that air passing through the first must change direction before entering the second pass. The paper is coated with a compound which retains its viscosity at all temperatures ranging between 10° and 180°.

SIZES—Three, 20 × 20, 16 × 20, and 16 × 25 in.

MANUFACTURED BY—American Radiator Co.



PRODUCT—Air filter—FibrePak.

PURPOSE—Throw-away type for small ventilating projects, warm-air furnaces, and in air conditioning applications.

FEATURES—Has an expansion gap, or air space, between two filter cells. The filter medium is oil-treated, ribbon-like vegetable fiber.

OPERATION—Incoming air passes through front filter cell at normal velocity. Upon entering air gap air expands and velocity is reduced. Then, as more air presses into the gap, increasing pressure is set up, velocity is increased and air passes through the rear filter at normal velocity.

MANUFACTURED BY—Independent Air Filter Co., Inc.

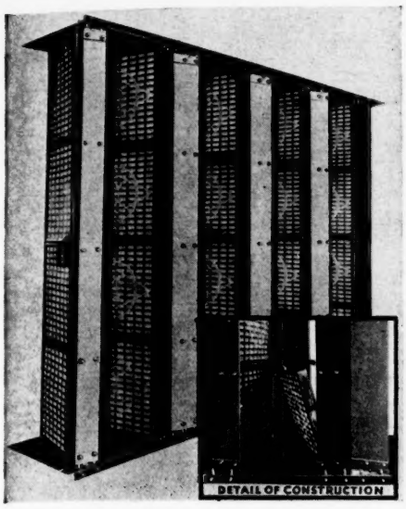
PRODUCT—Air filter, window type.

PURPOSE—To relieve hay fever and pollen asthma.

FEATURES—Motor and fan installed outside the window and are rubber mounted to give quiet operation. Unit is housed in green crackle finish non-rusting metal cabinet.

CAPACITY—11,000 cu. ft. per hr.

MANUFACTURED BY—Perfex Corp.



PRODUCT—Filter frame, V type.

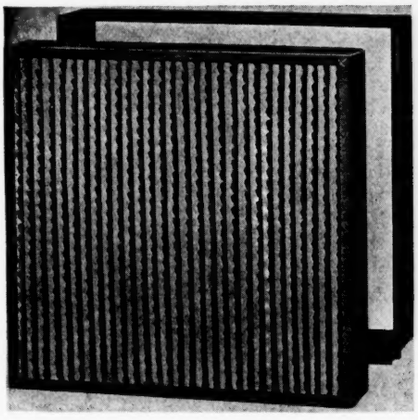
PURPOSE — Use with Dustop filters in air conditioning and ventilating systems in commercial and industrial buildings.

FEATURES—V shape saves 40% in frontal area and is so arranged as to avoid air turbulence and to give uniform distribution over filter faces. Lock forces filters tightly against frame.

SIZE—Each unit, 20 × 25 × 2 in.

CAPACITY—Each unit, 1000 c.f.m.

MANUFACTURED BY—Owens-Illinois Glass Co.

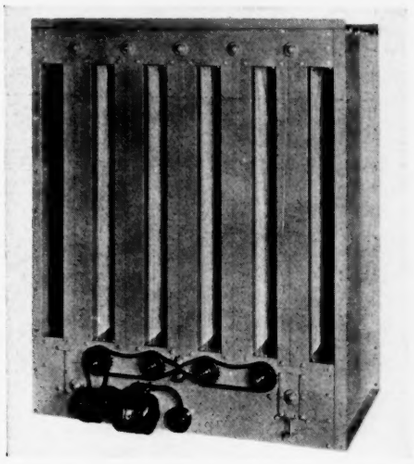


PRODUCT—Filter, renewable type.

CONSTRUCTION — Drifilter element, or cell, is made of a continuous sheet of 6-ply Airmat filtering material folded back and forth over corrugated spacers and encased in a cardboard channel section. Approximately 30 sq. ft. of filtering area is obtained in a single unit 20 in square by 4 in. deep. The unit consists of a filter element and a permanent metal frame. The frame is provided with clips for holding the filter cell in place.

CAPACITY—600 to 800 c.f.m., each unit.

MANUFACTURED BY—American Air Filter Co.



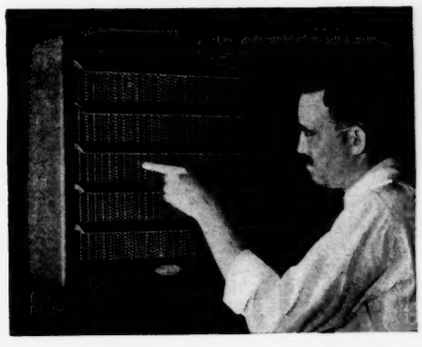
PRODUCT—Air filter.

FEATURES—Automatic, self-cleaning.

CONSTRUCTION—Wool felt curtain filtering medium, arranged in endless belt, to run over rolls driven by motor. When motor runs, curtain passes over nozzle of vacuum cleaner. Cleaning process is thus accomplished without removing filter from service. Motor started by time clock or by action of pressure gauge when dirt accumulation increases.

MANUFACTURED BY—Coppus Engineering Corp.

UNIT HEATERS

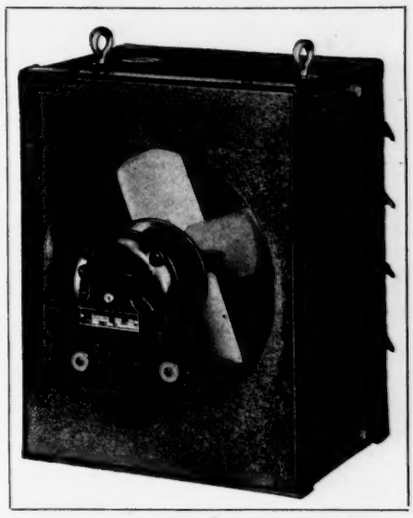


PRODUCT—Unit heater, Series 3.

FEATURES—Improvement in design to obtain more quiet operation and better appearance. Cabinets finished in dark brown morocco-like casing said to be durable and resistant to abrasion. They are electrically welded in one piece with integral reinforcing. Streamline tubes and resilient mountings reduce noise and vibration. Heating elements free to expand and contract within the shell. Elements anchored by special telescoping mountings to eliminate stresses between elements and cabinets. Curved louvers to reduce air resistance. Fully enclosed motor. Heating surface of smooth copper fins bonded to copper tubes.

CAPACITY—Up to 1200 sq. ft. steam.

MANUFACTURED BY—Fedders Mfg. Co., Inc.

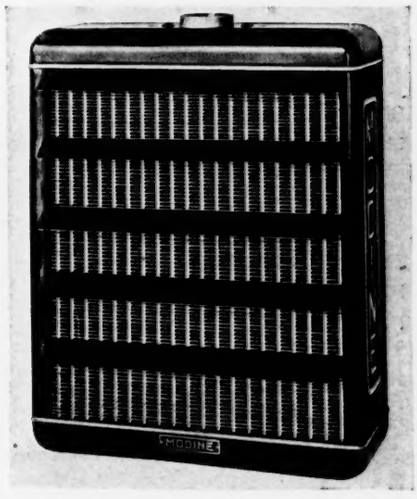


PRODUCT—Type V Dwyer unit heater.

CONSTRUCTION—Copper tubes and fins, assembled into bronze castings. Fan motor cradle-mounted in live rubber. Casing of heavy furniture steel, with solid bar steel trim front and back.

CAPACITY—36 sizes, from 95 to 1100 sq. ft.

MANUFACTURED BY—C. A. Dunham Co.



PRODUCT—Unit heater.

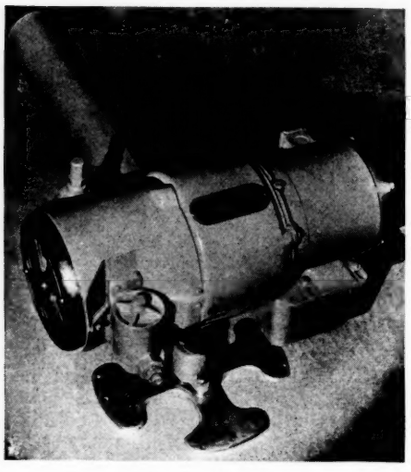
FEATURES—Copper fin with brass tube heating element. Cylindrical, seamless copper headers. Quiet motors. All except smaller sizes fitted with a velocity generator which distributes air leaving the fan over whole heater area. Streamlined adjustable deflectors. Constant or variable speed motors. Feature is arrangement of condenser tubes to take care of unequal expansion and contraction. After each tube passes through condenser the tube bends and extends horizontally into bottom tank. Each tube can expand or contract independently of adjacent tubes.

CAPACITY—11 sizes, from 76 to 2015 sq. ft.

MANUFACTURED BY—Modine Manufacturing Co.

Fuel-Burning Equipment

OIL-BURNING DEVICES



PRODUCT—Emancipator, oil burner.

FEATURES—Power pressure burner for No. 3 oil. Aluminum castings, streamlined, house the pump, fan, and motor. A 1/6-hp. Emerson motor, Webster transformer, Tuthill pump, Detroit Lubricator pressure valve and strainer, Draft-a-Justor draft regulator. Make of controls optional.

CAPACITY—1.35 to 4 gal. per hr.

MANUFACTURED BY—Motor Wheel Corp.

PRODUCT—Boiler-burner unit.

FEATURES—Combustion chamber entirely surrounded by water-backed surface. Equipped with low water cut-off, Gilbarco draftometer, and other built-in controls. Pressure, vacuum, and water gauges visible through indirectly illuminated instrument.

SIZE—26 × 42 in. in plan, 52 in. high.

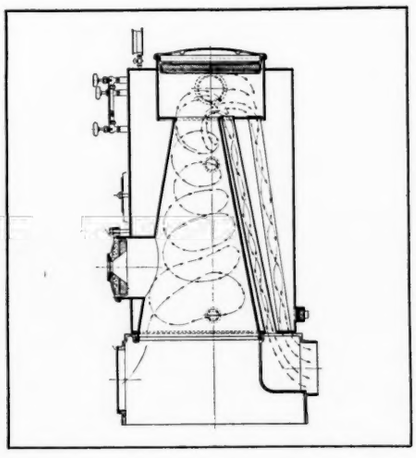
CAPACITY—600 sq. ft. steam radiator.

MANUFACTURED BY—Gilbert and Barker Mfg. Co.

PRODUCT—Boiler-burner unit.

FEATURES—Fired by Bethlehem-Doe oil burner. Contains unusually small boiler tubes, automatic combustion draft control, and "tank-saver" for domestic hot water. Oil burner is gun-type with rotary diffuser and rubber mountings. Available in a variety of sizes.

MANUFACTURED BY—The Bethlehem Foundry & Machine Co.



PRODUCT—Oil-burning steel boiler—Ti-Cone.

CONSTRUCTION — Cone-shaped combustion chamber, back of which are down-draft flues through which products of combustion travel to smoke outlet at base.

SIZES AND CAPACITIES — 3 sizes, 510, 748 and 1071 sq. ft. steam radiator.

MANUFACTURED BY—The Titusville Iron Works Co.

PRODUCT—Boiler-burner unit, Model R.

PURPOSE—Small steam or hot water heating plants.

FEATURES—Pressure atomizing burner, electric ignition, for No. 3 oil. Lacquered steel jacket on boiler, insulated.

CAPACITY—450 sq. ft. steam, 720 sq. ft. water.

MANUFACTURED BY—Wood Hydraulic Hoist & Body Co.

PRODUCT—Steel boiler-burner, Model KB1.

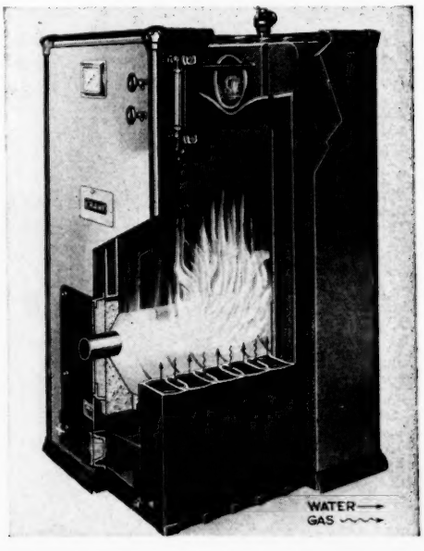
CONSTRUCTION — Welded steel. Burner is of high-pressure, atomizing type, and is located at rear of heater immediately below the smoke hood, operated by a ⅛-hp. 60-cycle motor, 110 volt a.c. Ignition is continuous electric spark type. Exterior is finished in blue lacquer and trimmed with polished chromium plating.

FEATURES — Spiral baffles, single-pass tube bank, and cylindrical combustion chamber. Self-priming, non-pulsating pump, ignition transformer which provides large, intensely hot spark, adjustable air shutter, and air turbulator, located inside air supply tube.

SIZE—42¾ in. high; 46 in. length of jacket, 20½ in. wide. Weight, 736 lb.

CAPACITY—420 to 600 sq. ft.

MANUFACTURED BY—Kewanee Boiler Corp. in collaboration with Kelvinator Corp.



PRODUCT—Oil-burning boiler, Series D-1.

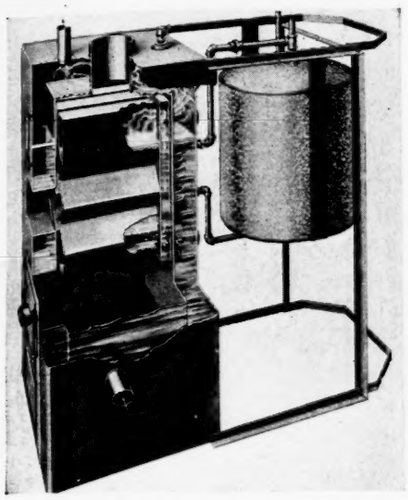
PURPOSE—Use with any gun-type burner.

FEATURES—A revertible flue, formed by means of passes between adjacent sections, applies the down-draft principle and provides secondary heating surface for absorbing heat of gases. These gases in the flue travel must cool before descending to the smokehood outlet, and in so doing, additional heat, often wasted up the stack, is transferred to the boiler water. Horizontal flues, to which the vertical flues conduct the gases of combustion, are below the combustion chamber.

MATERIAL—Cast iron.

CAPACITY—Up to 1400 sq. ft. steam.

MANUFACTURED BY—Crane Co.



PRODUCT—Boiler.

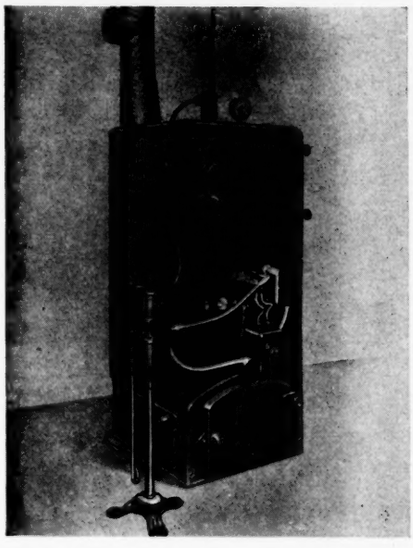
PURPOSE—Use with oil burners.

CONSTRUCTION—Consists of several generators holding small quantity of water that steams quickly. These generators are enclosed in and connected to outer water jacket that holds large quantity of water that cools slowly. Boilers jacketed and insulated, and there is a pyrex glass window through which fire can be seen. A copper coil is included for heating domestic water.

TYPES—Available in two models—for gun-type or rotary-type burners.

SIZES AND CAPACITIES—De luxe model made in three sizes, capacities 600 to 1200 sq. ft. steam radiator. Sectional boilers made in 30 sizes, capacities from 1500 to 15,000 sq. ft. steam radiator.

MANUFACTURED BY—Waterfilm Boilers, Inc.

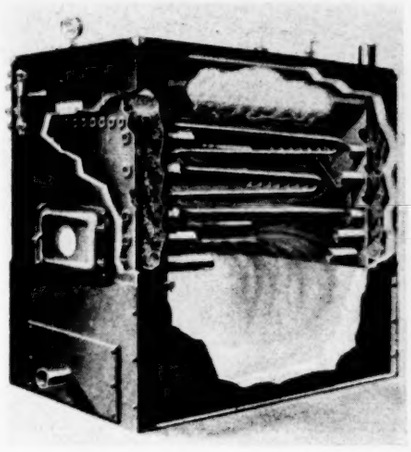


PRODUCT—Oil burner—S-N Junior.

OPERATION—Electric motor operates in a vertical position. End plate of motor is attached to a sump always partly filled with oil. In sump, directly operated at motor speed, is rotary air compressor and piston type valveless oil pump. Oil and air mixture delivered at 1½-lb. pressure through ½-in. copper tubing to spray nozzle head, mounted in special casting held by set screws to firedoor of heater. Uses heavy fuel oils.

PRICE—Retail, $160.

MANUFACTURED BY—Scott-Newcomb, Inc.



PRODUCT—Steel water tube heating boiler.

PURPOSE—For quick steaming with oil burning.

FEATURES—Steel plate combustion chamber, bolted together for installation of refractory.

MATERIALS—Top section, drums and tubes, of flanged boiler steel, in single unit. One inch water tubes.

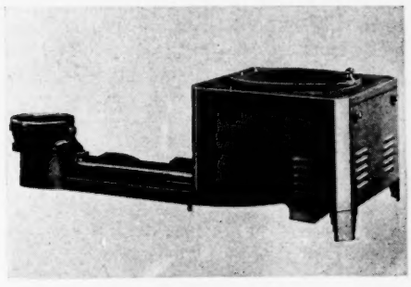
SIZE—15 sizes.

CAPACITY—800 to 4800 sq. ft. steam, depending on size.

ACCESSORIES—Automatic combustion control and (optional) instantaneous hot water heater.

MANUFACTURED BY—Smith Twin Tubular Boiler Co.

COAL BURNING DEVICES



PRODUCT—Stoker, No. 25.

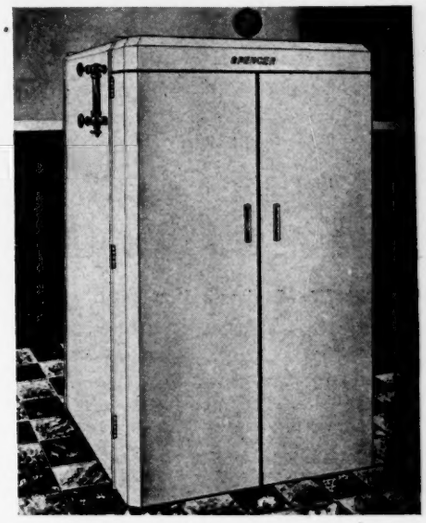
PURPOSE—Small houses.

FEATURES—Underfeed burner designed similarly to company's large-size burners. Air and coal ducts cast in one piece. A retort of special design supplies air through ports to obtain good combustion with free-burning coal. Feed screw of nickel cast iron. Comes complete with thermostat, stoker switch, relay, and circuit breaker for warm-air furnaces where necessary.

SIZE—Retorts designed for 17 in. round or 10 × 15 in. rectangular fireboxes, and larger sizes.

PRICE—To retail under $250.

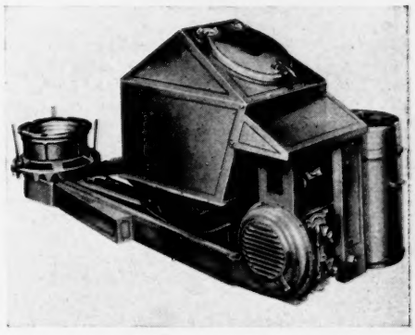
MANUFACTURED BY—Butler Manufacturing Co.



PRODUCT—Boiler, Model C-N.

FEATURES—A magazine feed boiler, designed to burn chestnut size anthracite or coke. Boiler includes a water-jacketed magazine for holding a day's supply of fuel; sloping grates, and automatic coal action similar to that in company's line of buckwheat-burning boilers. Colored steel jacket is offered as optional equipment at small additional charge.

MANUFACTURED BY—Spencer Heater Co.



PRODUCT—Stoker.

FEATURES—Underfeed type, circular retort. For burning anthracite. Has automatic ash remover, but also available without this feature. Three rates of coal feed through variable speed transmission driven by V-belt.

SIZE—400-lb. hopper. Three sizes of retorts, 15, 18 and 22 in. dia.

CAPACITY—Three capacities, 20, 35 and 50 lb. per hr.

MANUFACTURED BY—Iron Fireman Manufacturing Co.

PRODUCT—Stoker-boiler unit.

PURPOSE—Automatic burning of anthracite.

FEATURES—White finish, automatic coal feed and ash removal, glass observation port, built-in Taco.

SIZES—4 sizes boiler, 3 sizes stoker in combination.

CAPACITIES—700 to 1300 sq. ft. steam radiator. Coal burner maximum fuel rates, 26, 40 and 54 lb. per hr.

MANUFACTURED BY—The Electric Furnace-Man, Inc. and American Radiator Co.

PRODUCT—Steel Boiler.

PURPOSE—Extension to line of Premier boilers, adding 25 and 31 in. models.

FEATURES—Designed for three types of fire: Type OB for oil-firing, Type DB for hand-firing, and Type MB for stoker-fired installations. Units are all of double-pass horizontal fire-tube type.

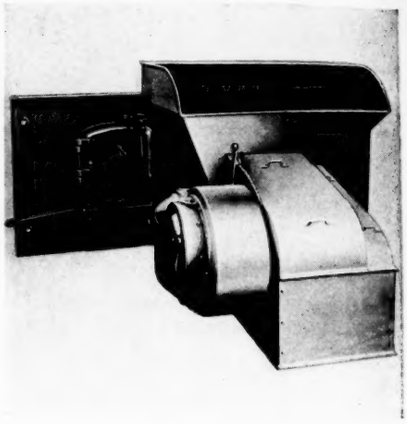
CAPACITIES—485 to 2710 sq. ft. steam.

MANUFACTURED BY—National Radiator Corp.

PRODUCT—Stoker, Type S.

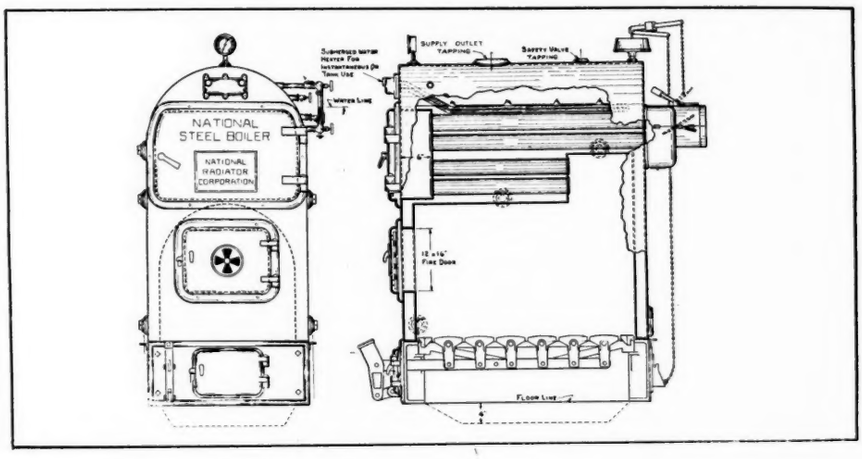
PURPOSE—Small heating and industrial plants, either fire or water tube boilers.

CONSTRUCTION—Has screw conveyor which advances coal from hopper to entrance of retort and reciprocating pusher in retort continues feeding and provides agitation for fuel bed. Coal distribution by lateral movement of moving grate bars which alternate with fixed bars. An integral blower supplies air to windbox under stoker. Volume of air is regulated automatically through control lever to suit

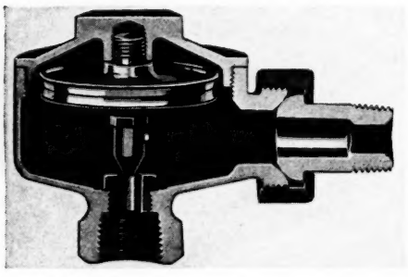


stoker speed. A constant speed motor drives stoker through integral variable-speed transmission permitting 16 rates of coal feed. Coal feed may be cut off by a clutch so that fan may continue to operate for burning out fuel. Designed to employ either center or side retort.

MANUFACTURED BY—Combustion Engineering Co.



Steam and Hot Water Specialties



PRODUCT—Radiator traps, Series G.

PURPOSE—Trap designed for rapid condensing concealed convectors.

CONSTRUCTION—Thermostatic element of a duplex diaphragm arrangement, constructed of a rolled phosphor bronze alloy. The maximum movement of the Nitralloy cone-type valve is 80% of the valve seat diameter, providing for removal of dirt and foreign matter when the valve is open. The thermostatic fluid used in the element is sensitive to temperature change, a differential of less than 2° being required to fully open the valve.

SIZES—Three sizes.

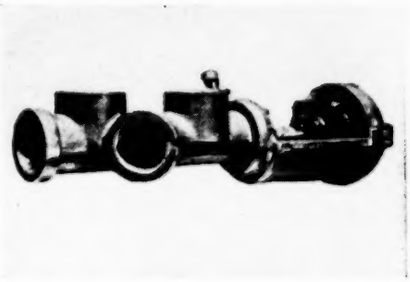
CAPACITIES—From 100 sq. ft. to 400 sq. ft., of direct radiator, at 2 lb. pressure.

MANUFACTURED BY—Illinois Engineering Co.

PRODUCT—Copper fittings.

FEATURES—Cast bronze soldered fittings and flared tube fittings, for use with Anaconda deoxidized copper water tubes.

MANUFACTURED BY—American Brass Co.



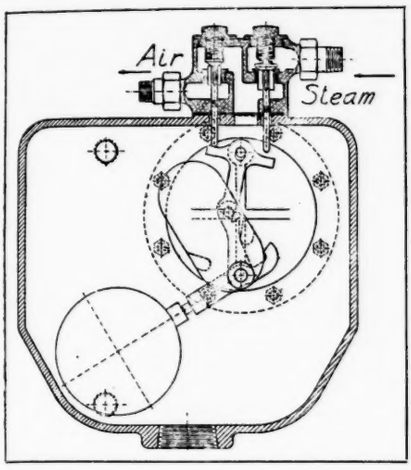
PRODUCT—Hot water circulator.

PURPOSE—Year-round hot water supply from the heating boiler.

OPERATION—Single motor drives two propeller wheels operating in separate chambers. One circulates boiler water through the radiators, the other boiler water through the indirect heater. Aquastat controls

automatic firing device to control water temperature; room thermostat operates motorized valve to regulate water flow through heating system. In summer, storage tank aquastat controls circulator. In steam systems, the double circulator forces water through the indirect heater and circulates water in the storage tank.

MANUFACTURED BY—Johanson Water Heater Co., Inc.



PRODUCT—Boiler return trap.

PURPOSE—Alternating receiver in vapor heating systems.

OPERATION—Completely enclosed unit. Inlet and outlet are through the same opening in bottom. When receiver is filled to a given level, copper float in the body trips a weight which closes the air vent valve and opens the steam valve, applying boiler pressure to the receiver. The trap is installed above the boiler water level, and gravity returns the condensation to the boiler, dropping the float to reverse the valve mechanism, starting a new cycle.

CONSTRUCTION—Valves are mounted together in a single compact casting bolted to the top of the receiver and are readily removable for inspection. The float and weight mechanism are attached to a cover plate on the side of the receiver for easy removal for inspection.

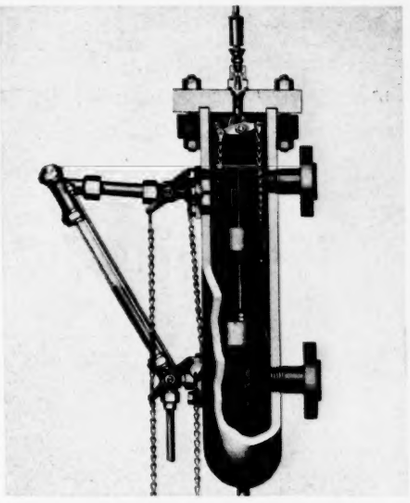
MANUFACTURED BY—Sarco Co., Inc.

PRODUCT—Steam trap, No. 200.

FEATURES—Inverted bucket type. Unbreakable plug type valve seat, pipe plug in cap for test outlet. Inlet and outlet in body are horizontal and opposite. Maximum working pressure, 125 lb.

CAPACITY—400 to 690 lb. of condensation per hr.

MANUFACTURED BY—Armstrong Machine Works.



PRODUCT—Alarm water column and inclined water gauge.

FEATURES—Balanced solid weights working on displacement principle operate whistle alarm at high and low water levels. Improvements include smaller, lighter, water column body, more simple and flexible operating mechanism for alarm, and inclined connecting member at top of gauge which drains back condensate which might otherwise collect at this point.

MANUFACTURED BY—Yarnall-Waring Co.

PRODUCT—Bronze pipe fitting, threadless.

CONSTRUCTION — Incorporates in each opening of fitting a ring of brazing alloy, known as Sil-Fos. To install, slip pipe into fittings, then apply oxy-acetylene flame in proper manner until white Walseal ring appears as shown in illustration between pipe and fitting outlet. Sil-Fos flows out between fitting and pipe in both directions from ring. Should it be necessary to remove fitting it can be used again by repeating operation employed in making the original joint.

MANUFACTURED BY—Walworth Co., in collaboration with Air Reduction Sales Co. and Handy and Harmon.

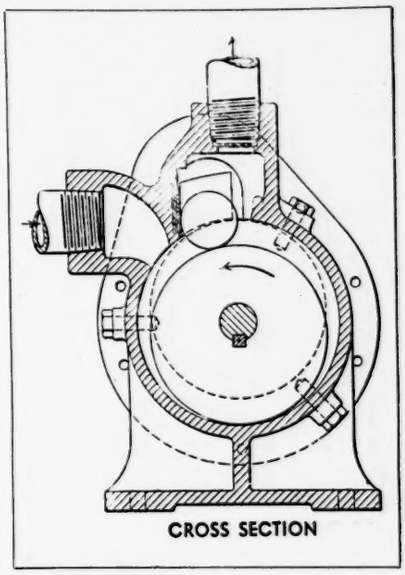
PRODUCT—Piston ring expansion joint.

PURPOSE—Extension of piston ring feature to entire line.

FEATURES—Non-corrosive gland studs and nuts, correctly proportioned stuffing box, machined external guide in one piece for 125-lb. and 250-lb. design, and special two-piece guide for 400-lb. joint. Some minor improvements have been made, such as enlarged relief chamber from which vent relieves accumulated pressure prior to removing gland for addition of packing.

RANGE—125, 250, and 400 lb.

MANUFACTURED BY—American District Steam Co.



PRODUCT—Pump, rotary positive displacement type.

CONSTRUCTION — Displacement mechanism consists of rotor keyed to shaft and free-rolling roller on top of rotor. Rotor is rotated concentrically on shaft and is provided at high point with extended cut-off surface which closes two ports at completion of each discharge.

RANGE—Designed to operate on non-lubricant liquids up to 100-lb. pressure. Recommended speed is from 275 to 300 r.p.m., but higher speeds may be used under certain conditions.

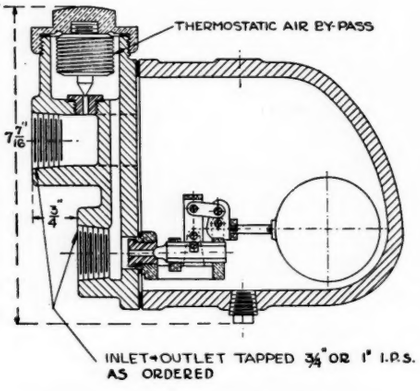
MANUFACTURED BY—Anderson Rotary Pump Co.

PRODUCT—Valves, renewable bronze, angle and globe.

CONSTRUCTION—Radial seat, between body and bonnet, gives tight joint and alignment. Disc ring serves in the control of steam and also on hot and cold water. It is composed of long-fibre asbestos, compounded with vulcanizing elements and cured. Disc holder is of standard dimensions, permitting use of

other standard makes of disc rings if desired. Stem is of rolled rod bronze. At least five Acme threads are at all times in contact with the bonnet. Union nut is of heavy bronze with large hexes. A protected top seat above the threads on stem gives a clean, tight joint when valve is fully opened for repacking.

MANUFACTURED BY—The Fairbanks Co.

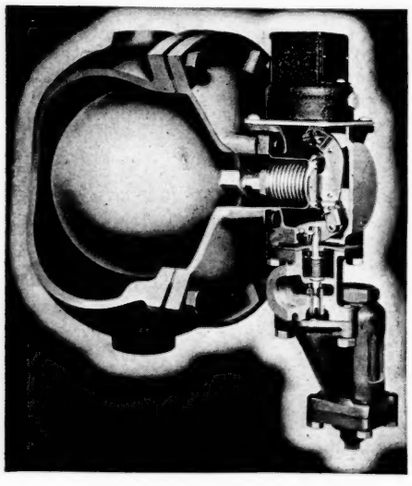


PRODUCT—Combination float and thermostatic trap, Type FTO-H.

FEATURES—Compact and light in weight. Can be supported directly on the piping. Inlet and outlet on same side, a small vertical distance apart for easy connection to horizontal pipes. The automatic air bypass is arranged on the down-board side of the trap so that thermostatic element is not exposed to the full steam pressure. Main discharge valve and seat are of stainless steel.

CAPACITIES—1900 to 2100 lb. of water per hr.

MANUFACTURED BY—Sarco Co., Inc.

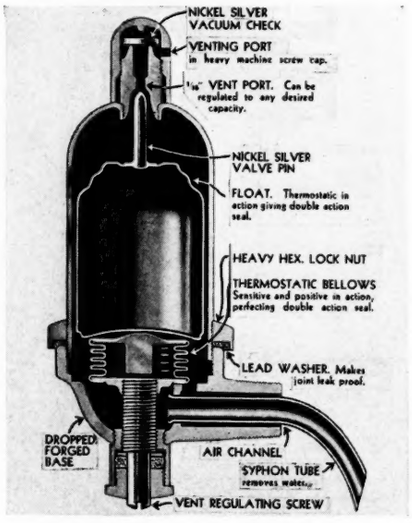


PRODUCT—Water feeder.

FEATURE—Straight thrust to valve obtained through cam and roller action. Compound lever mechanism doubles effective closing power of float.

TYPES—No. 47 for boilers up to 5000 sq. ft. of radiator; No. 47-2, for automatic jobs, includes switch; No. 51, for boilers over 5000 sq. ft.; No. 51-A, combines safety feeder and low water cut-off.

MANUFACTURED BY—McDonnell & Miller.

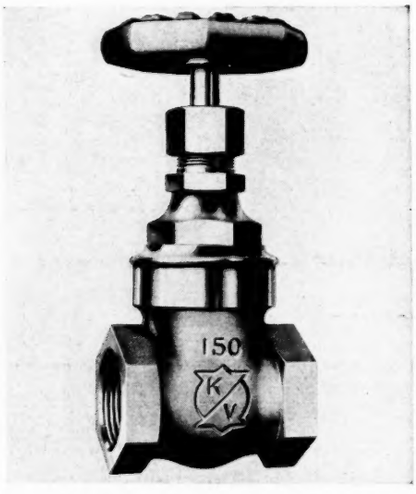

NICKEL SILVER VACUUM CHECK
VENTING PORT in heavy machine screw cap.
1/16" VENT PORT. Can be regulated to any desired capacity.
NICKEL SILVER VALVE PIN
FLOAT. Thermostatic in action giving double action seal.
HEAVY HEX. LOCK NUT
THERMOSTATIC BELLOWS Sensitive and positive in action, perfecting double action seal.
LEAD WASHER. Makes joint leak proof.
DROPPED FORGED BASE
AIR CHANNEL
SYPHON TUBE removes water
VENT REGULATING SCREW

PRODUCT—Radiator air valve, the Vent-Rite.

PURPOSE—To balance the radiators in a one-pipe steam system.

OPERATION—Balancing is accomplished by controlling distribution of steam by increasing or decreasing venting capacity of each air valve. Adjustment is by a regulating screw in bottom of vent by which thermostatic bellows is moved nearer to, or away from, valve seat. This makes it possible to induce heat in one radiator and repel it from another at will.

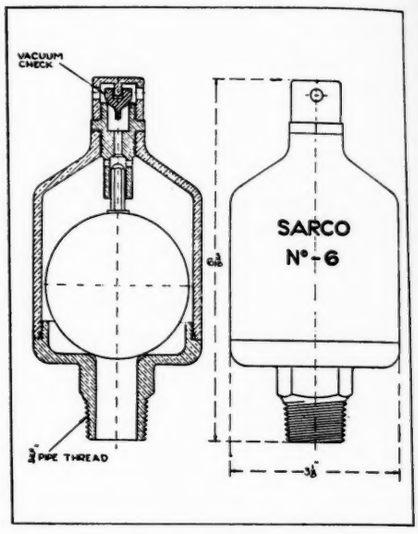
MANUFACTURED BY—Anderson Manufacturing Co.



PRODUCT—Gate valve, Fig. 23.

FEATURES—Heavy standard bronze gate valve for 150 lb. steam pressure and 250 lb. water, oil, or gas pressure. Has features incorporated in Fig. 27 standard bronze gate valve but is heavier throughout. Large bonnet hex placed close to body makes valve more rigid and assists easier removal of the bonnet and stem assembly.

MANUFACTURED BY—The Kennedy Valve Mfg. Co.



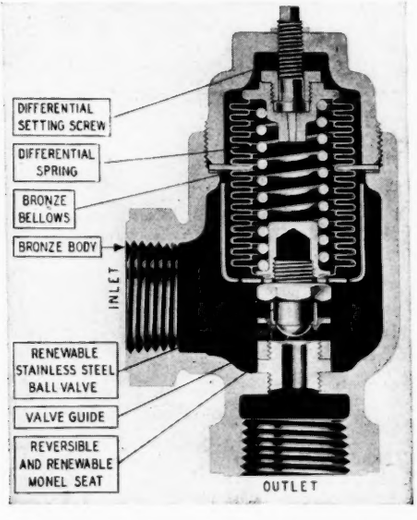
PRODUCT—Air eliminator, No. 6.

PURPOSE—For venting vapor heating systems at one central point in the basement.

OPERATION—A ball valve prevents water from escaping, and a separate check valve excludes air from the system while under a vacuum.

CAPACITY—2000 sq. ft. steam radiator.

MANUFACTURED BY—Sarco Co., Inc.



PRODUCT—Steam trap, thermostatic.

FEATURES—Differential setting feature. Adjusting screw at top of trap may be set to discharge condensate at temperature corresponding to as much as 20 lb. less than operating steam pressure without further adjustment. Renewable and

reversible monel seat, renewable stainless steel ball valve.

SIZES—½, ¾, and 1 in.

MANUFACTURED BY—C. J. Tagliabue Mfg. Co.

PRODUCT—Pipe coupling.

PURPOSE—Joining straight pipe without threading, beveling or upsetting, with unskilled labor.

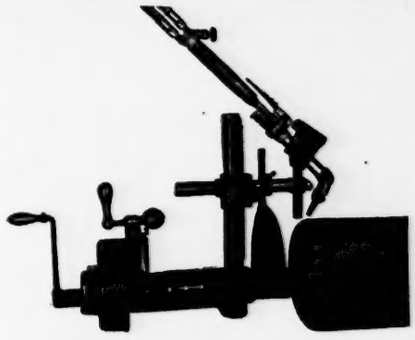
OPERATION—Consists of five parts, comprising two half coupling sections containing gripping devices, one gasket with metal protected sections, and two bolts. Coupling sections are of drop forged steel. Gripping rings are drop forged and heat treated and assembled into the coupling sections to form an integral part of the coupling itself. The gasket is designed to provide a double seal, effective against either pressure or vacuum. Two steel reinforcements on the gasket protect it from the pinching action of the coupling during assembly.

MANUFACTURED BY—Champion Machine & Forging Co.

PRODUCT—Air and vacuum radiator valve, Econ-O-Vac No. 100.

OPERATION—Steam entering radiator on reaching valve expands fluid in float, resulting pressure spring diaphragm from concave to convex shape, causing seating pin to close vent hole. Inside of bellows occupied by air at atmospheric pressure at all times.

MANUFACTURED BY—The Dole Valve Co.



PRODUCT—Pipe end cutting and beveling machine.

OPERATION—Machine is clamped to pipe with three spreaders on the inside of pipe. Blowpipe, adjustable for diameter and angle of cut, is supported on arm revolved about axis by hand crank. Bronze shield keeps sparks and slag off controls.

FEATURES—Machine rotates about true center of pipe, does not ride on uneven outer wall of pipe. Thus beginning and end of cut always meet. Two sets of arms.

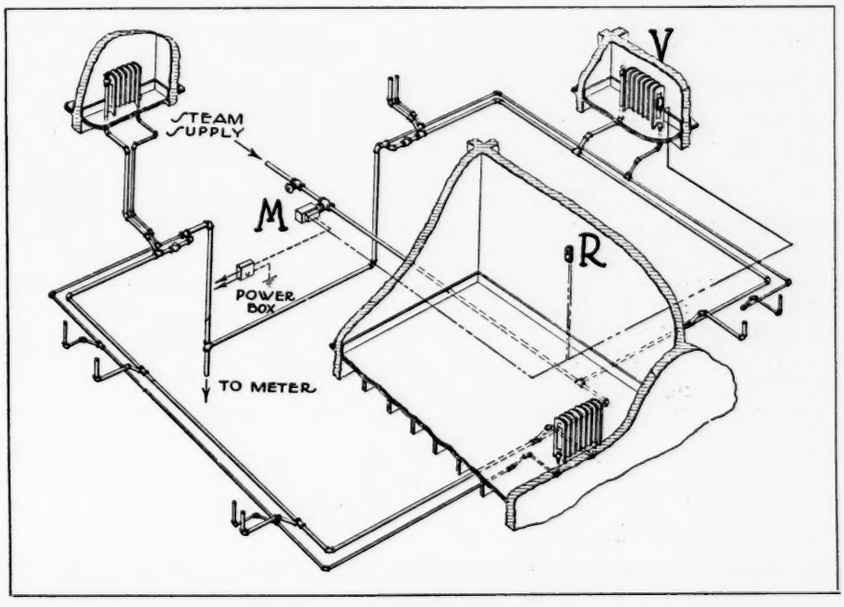
MANUFACTURED BY—The Linde Air Products Co.

Controls, Instruments, and Motors

PRODUCT—Compensated control system.

PURPOSE—Zone temperature maintenance, providing automatic control under changing weather and occupancy conditions.

OPERATION—The zone, in which is motor-operated valve, M, is supplied with steam. This valve opens or closes with impulses originating at room thermostat, R. Room thermostat is aided by variable limit thermostat mounted on one of the radiators, V. Room thermostat contains small electric heater capable of slowly raising temperature of thermostatic element several degrees above room temperature. This heater is controlled by variable limit thermostat which operates on a change in temperature instead of at fixed point. When room thermostat calls for heat, valve M opens and admits steam. As the radiators warm up, thermostat, V, rises a few degrees and closes, energizing heater in room thermostat. Consequently, it anticipates the normal lag. Continued rise in radiator temperature causes friction coupling to slip. If room is several degrees cooler than thermostat setting, there will be a greater delay before valve is closed. Radiators therefore become warmer and heat room more quickly. After heater element is shut off room thermostat returns to room temperature and if rooms have not received enough heat will close its cold contact, valve will be open again, and cycle repeated.



MANUFACTURED BY—Barber-Colman Co.

PRODUCT—Motor, 8 speed, gear type

FEATURES—Four-speed motor and a two-speed gear. Two, four, and six-speed gear motors are also available. Motor may be wound for either single-, two-, or three-phase power. Gears are of helical-cut type. Speed of gear is changed by lever.

MANUFACTURED BY—Century Electric Co.

PRODUCT—Split-phase motor, Type S

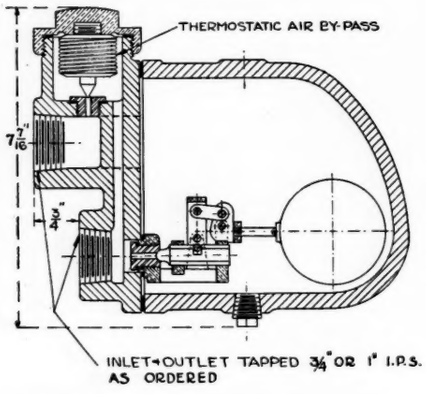
PURPOSE—Powering oil burners, fans, blowers, where starting load is not greatly over running load.

CONSTRUCTION—Stator is of laminated steel with steel field ring welded around laminations. Rotor is constructed of laminated punchings, held together by copper conductors.

OPERATION—The stator has a main field winding and also a phase or starting winding. At a predetermined speed, a positive cut-out

other standard makes of disc rings if desired. Stem is of rolled rod bronze. At least five Acme threads are at all times in contact with the bonnet. Union nut is of heavy bronze with large hexes. A protected top seat above the threads on stem gives a clean, tight joint when valve is fully opened for repacking.

MANUFACTURED BY—The Fairbanks Co.

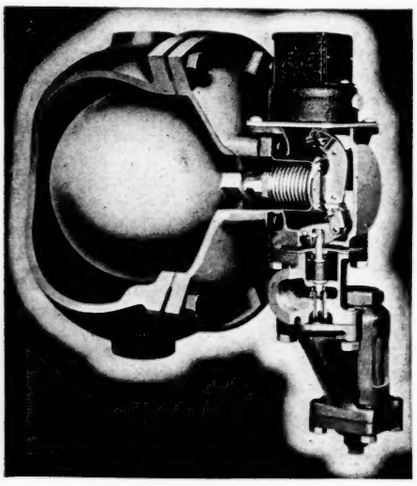


PRODUCT—Combination float and thermostatic trap, Type FTO-H.

FEATURES—Compact and light in weight. Can be supported directly on the piping. Inlet and outlet on same side, a small vertical distance apart for easy connection to horizontal pipes. The automatic air bypass is arranged on the down-board side of the trap so that thermostatic element is not exposed to the full steam pressure. Main discharge valve and seat are of stainless steel.

CAPACITIES—1900 to 2100 lb. of water per hr.

MANUFACTURED BY—Sarco Co., Inc.

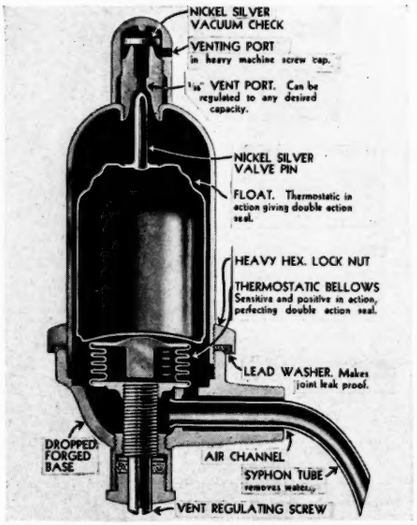


PRODUCT—Water feeder.

FEATURE—Straight thrust to valve obtained through cam and roller action. Compound lever mechanism doubles effective closing power of float.

TYPES—No. 47 for boilers up to 5000 sq. ft. of radiator; No. 47-2, for automatic jobs, includes switch; No. 51, for boilers over 5000 sq. ft.; No. 51-A, combines safety feeder and low water cut-off.

MANUFACTURED BY—McDonnell & Miller.

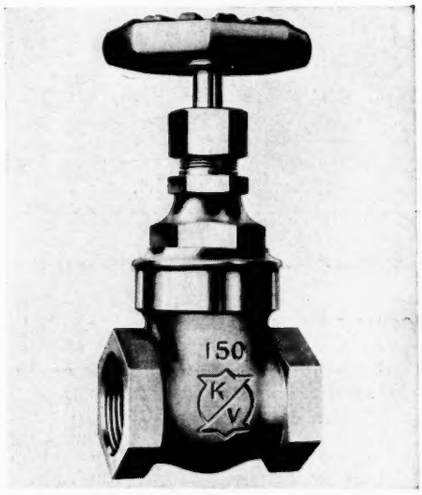

NICKEL SILVER VACUUM CHECK
VENTING PORT in heavy machine screw cap.
1/16" VENT PORT. Can be regulated to any desired capacity.
NICKEL SILVER VALVE PIN
FLOAT. Thermostatic in action giving double action seal.
HEAVY HEX. LOCK NUT
THERMOSTATIC BELLOWS Sensitive and positive in action, perfecting double action seal.
LEAD WASHER. Makes joint leak proof.
DROPPED FORGED BASE
AIR CHANNEL
SYPHON TUBE removes water
VENT REGULATING SCREW

PRODUCT—Radiator air valve, the Vent-Rite.

PURPOSE—To balance the radiators in a one-pipe steam system.

OPERATION—Balancing is accomplished by controlling distribution of steam by increasing or decreasing venting capacity of each air valve. Adjustment is by a regulating screw in bottom of vent by which thermostatic bellows is moved nearer to, or away from, valve seat. This makes it possible to induce heat in one radiator and repel it from another at will.

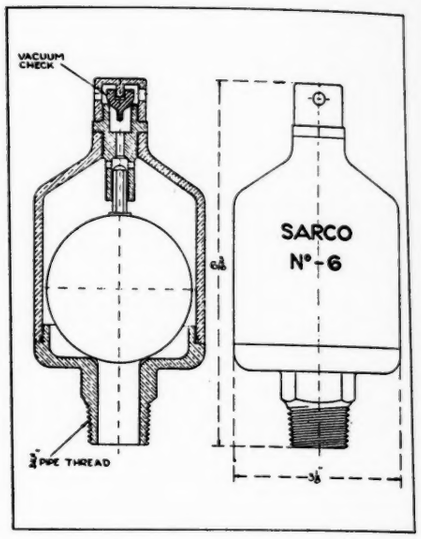
MANUFACTURED BY—Anderson Manufacturing Co.



PRODUCT—Gate valve, Fig. 23.

FEATURES—Heavy standard bronze gate valve for 150 lb. steam pressure and 250 lb. water, oil, or gas pressure. Has features incorporated in Fig. 27 standard bronze gate valve but is heavier throughout. Large bonnet hex placed close to body makes valve more rigid and assists easier removal of the bonnet and stem assembly.

MANUFACTURED BY—The Kennedy Valve Mfg. Co.



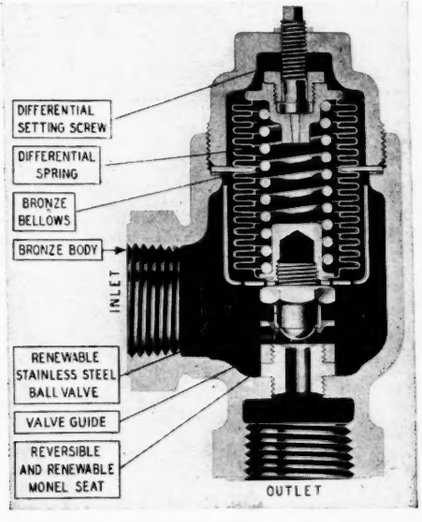
PRODUCT—Air eliminator, No. 6.

PURPOSE—For venting vapor heating systems at one central point in the basement.

OPERATION—A ball valve prevents water from escaping, and a separate check valve excludes air from the system while under a vacuum.

CAPACITY—2000 sq. ft. steam radiator.

MANUFACTURED BY—Sarco Co., Inc.



PRODUCT—Steam trap, thermostatic.

FEATURES—Differential setting feature. Adjusting screw at top of trap may be set to discharge condensate at temperature corresponding to as much as 20 lb. less than operating steam pressure without further adjustment. Renewable and

reversible monel seat, renewable stainless steel ball valve.

SIZES—½, ¾, and 1 in.

MANUFACTURED BY—C. J. Tagliabue Mfg. Co.

PRODUCT—Pipe coupling.

PURPOSE—Joining straight pipe without threading, beveling or upsetting, with unskilled labor.

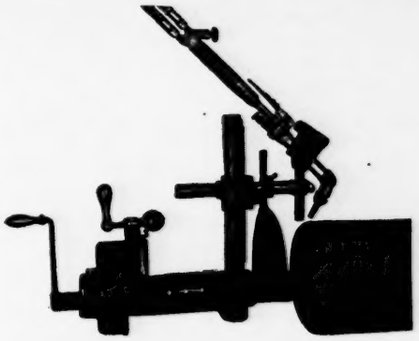
OPERATION—Consists of five parts, comprising two half coupling sections containing gripping devices, one gasket with metal protected sections, and two bolts. Coupling sections are of drop forged steel. Gripping rings are drop forged and heat treated and assembled into the coupling sections to form an integral part of the coupling itself. The gasket is designed to provide a double seal, effective against either pressure or vacuum. Two steel reinforcements on the gasket protect it from the pinching action of the coupling during assembly.

MANUFACTURED BY—Champion Machine & Forging Co.

PRODUCT—Air and vacuum radiator valve, Econ-O-Vac No. 100.

OPERATION—Steam entering radiator on reaching valve expands fluid in float, resulting pressure spring diaphragm from concave to convex shape, causing seating pin to close vent hole. Inside of bellows occupied by air at atmospheric pressure at all times.

MANUFACTURED BY—The Dole Valve Co.



PRODUCT—Pipe end cutting and beveling machine.

OPERATION—Machine is clamped to pipe with three spreaders on the inside of pipe. Blowpipe, adjustable for diameter and angle of cut, is supported on arm revolved about axis by hand crank. Bronze shield keeps sparks and slag off controls.

FEATURES—Machine rotates about true center of pipe, does not ride on uneven outer wall of pipe. Thus beginning and end of cut always meet. Two sets of arms.

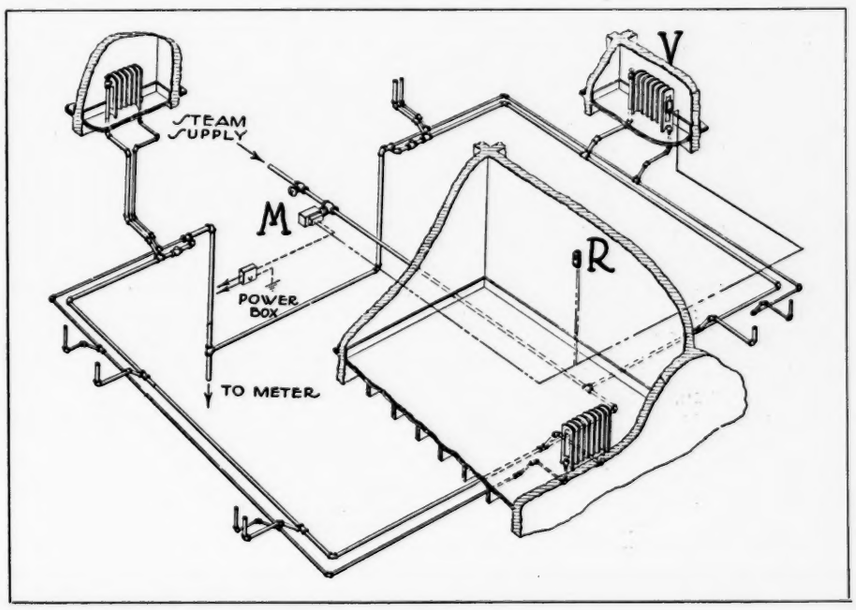
MANUFACTURED BY—The Linde Air Products Co.

Controls, Instruments, and Motors

PRODUCT—Compensated control system.

PURPOSE—Zone temperature maintenance, providing automatic control under changing weather and occupancy conditions.

OPERATION—The zone, in which is motor-operated valve, M, is supplied with steam. This valve opens or closes with impulses originating at room thermostat, R. Room thermostat is aided by variable limit thermostat mounted on one of the radiators, V. Room thermostat contains small electric heater capable of slowly raising temperature of thermostatic element several degrees above room temperature. This heater is controlled by variable limit thermostat which operates on a change in temperature instead of at fixed point. When room thermostat calls for heat, valve M opens and admits steam. As the radiators warm up, thermostat, V, rises a few degrees and closes, energizing heater in room thermostat. Consequently, it anticipates the normal lag. Continued rise in radiator temperature causes friction coupling to slip. If room is several degrees cooler than thermostat setting, there will be a greater delay before valve is closed. Radiators therefore become warmer and heat room more quickly. After heater element is shut off room thermostat returns to room temperature and if rooms have not received enough heat will close its cold contact, valve will be open again, and cycle repeated.



MANUFACTURED BY—Barber-Colman Co.

PRODUCT—Motor, 8 speed, gear type

FEATURES—Four-speed motor and a two-speed gear. Two, four, and six-speed gear motors are also available. Motor may be wound for either single-, two-, or three-phase power. Gears are of helical-cut type. Speed of gear is changed by lever.

MANUFACTURED BY—Century Electric Co.

PRODUCT—Split-phase motor, Type S

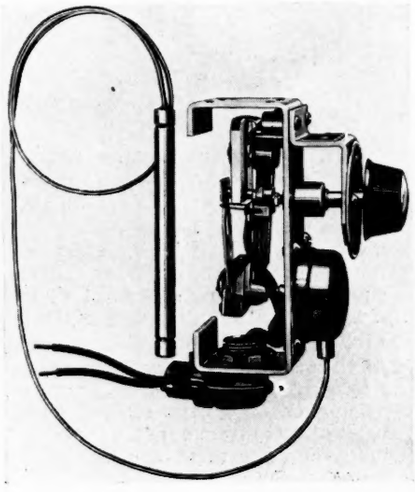
PURPOSE—Powering oil burners, fans, blowers, where starting load is not greatly over running load.

CONSTRUCTION—Stator is of laminated steel with steel field ring welded around laminations. Rotor is constructed of laminated punchings, held together by copper conductors.

OPERATION—The stator has a main field winding and also a phase or starting winding. At a predetermined speed, a positive cut-out

opens the phase circuit and the motor runs as a standard induction unit, without contact between field and armature.

MANUFACTURED BY—The Emerson Electric Mfg. Co.



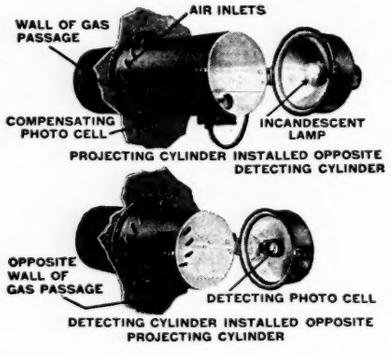
PRODUCT—Cabinet thermostat, No. 261.

PURPOSE—Designed primarily for automatic temperature control of forced circulation, cabinet type, cooling or air conditioning units.

OPERATION—On units for heating, thermostat is arranged to break electric circuit on increase of room temperature and may control an electric heating element on electric unit heaters or control a gas valve, either solenoid or electric, on gas-fired unit heaters. In either case, may control the fan also. Can be used to control the fan on units heated by steam or hot water or to operate a solenoid or electric valve in the steam or water supply. For cooling units, the thermostat is arranged to make circuit on increase of temperature.

RANGE—45° to 80° for heating, 75° to 95° for cooling.

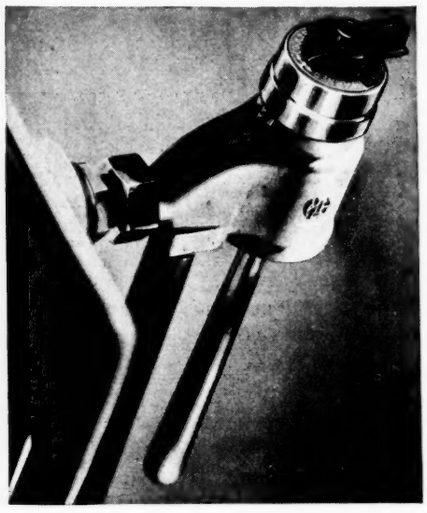
MANUFACTURED BY—Detroit Lubricator Co.



PRODUCT—Smoke density recorder.

FEATURES—Compensated for variations in light source intensity. Operated by Galvatron electronic relay circuit. Consists of receiving element, a recorder usually mounted on individual boiler panel board and transmitting element consisting of projecting cylinder and detecting cylinder mounted on opposite sides of the breeching or flue gas passage. Makes a continuous record of relative smoke density on 12-in. chart.

MANUFACTURED BY—Bailey Meter Co.



PRODUCT—Modustat.

PURPOSE—Improvement to Modustat, adding manual feature which permits normal hand setting of valve from full open to full closed, as with any hand valve. New feature makes it particularly desirable for hotels and hospitals.

OPERATION—When set to operate in the automatic range, any desired room temperature from 60° to 80° will be maintained without further attention, the valve automatically modulating to regulate the flow to exactly the amount of steam required. All settings for both automatic operation and manual control are made with the lever on top of the valve. Also available in models for concealed radiators and with key setting.

MANUFACTURED BY—Minneapolis-Honeywell Regulator Co.

PRODUCT—Water control valve, No. 66.

PURPOSE—Air conditioning and refrigeration and industrial fields. Also used for an air valve.

OPERATION—Based on bypass principle for opening main valve seat. Water enters inlet against main valve seat and bypass solenoid valve. When solenoid coil is energized, it raises bypass plunger. This plunger is not attached directly to bypass valve stem, but travels a short distance and gains momentum before it raises the valve stem itself. When bypass valve is opened it allows water to force diaphragm down immediately, which in turn opens main valve seat, allowing full capacity of water to pass through. As solenoid is de-energized, bypass is closed. Since main valve is opened against spring, it returns to closed position. The water above diaphragm passes through small port in diaphragm.

MATERIALS—Valve construction is of brass and non-ferrous material. The plunger is made of stainless steel, the strainer of monel metal, and the valve seats of special rubber composition.

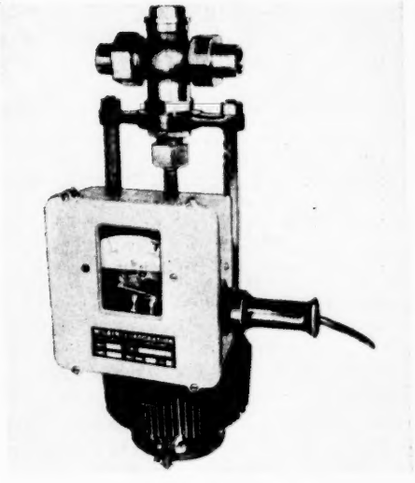
MANUFACTURED BY—Automatic Products Co.

PRODUCT—Temperature regulators.

PURPOSE AND FEATURES—Type KN-15, for control of brine cooling coils. Temperature-sensitive bulb rigidly attached to valve. Customary flexible connecting tubing is omitted.

Type TR-20, designed to make possible use of automatic temperature control on equipment for which standard regulator was too costly, is new junior model of Sarco tank regulator. Made in three sizes, ⅜, ½, and ¾ in. Has a small bulb, fitted with union connection.

MANUFACTURED BY—Sarco Co., Inc.



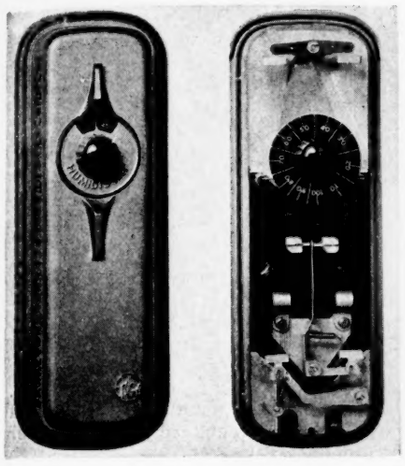
PRODUCT—Electric temperature regulators.

PURPOSE—Combinations are available for process industries, refrigeration, air conditioning, weather and zone control of heating systems, and room control.

OPERATION—A heat motor is employed to operate the valve. This motor consists of a pressure chamber in which volatile fluid is vaporized by electric strip heater. Vapor pressure built up compresses a flexible bellows in the chamber. The valve plunger is attached to this bellows and is moved upwards

when the bellows is compressed. Limit switches, actuated by the valve stem itself, control and reverse the valve stroke. Six different valve positions can be secured for a total temperature difference at the thermostat of 10°.

MANUFACTURED BY—Wilbin Instrument Corp.



PRODUCT—Humidistat.

PURPOSE—Process or comfort application, controlling solenoid valves, motor valves, damper motor, etc, at either low or line voltage.

CONSTRUCTION—A hygroscopic element of human hair provides sensitivity and is said to control the humidity within 1% differential. A knob and rotating dial setting permits regulation between 10% and 100%. Case is constructed of aluminum, finished in Alumilite finish in polished bronze or satin silver.

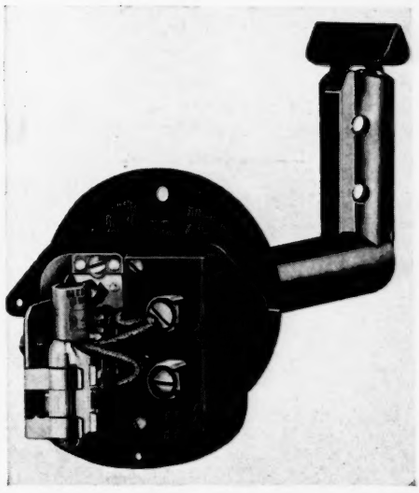
MANUFACTURED BY—Julien P. Friez & Sons.

PRODUCT—Weatherstat.

PURPOSE—To react to temperature, wind direction, wind velocity, and solar radiation and to compensate for outside changes by supplying more or less heat to building or zone it controls. Applicable to buildings heated by steam or vapor furnished at a relatively constant pressure; steam or vapor furnished intermittently by a gas or oil burner, or hot water under forced circulation.

CONSTRUCTION and OPERATION—Consists of a mass of iron, sufficient to obtain necessary thermal capacity. This iron is shaped to contain thermostatic element with electric contacts, and is arranged to house a small electrical heating element within the mass. Unit is mounted in small waterproof housing and the entire unit is placed where it will be subject to the same weather conditions as the zone or building which it controls. Heat release from electrical heating element is designed to, and by an adjustable resistance can be made to, bear same relation to heat losses from control housing as heat release from heating fixtures within building bears to heat losses of building.

MANUFACTURED BY—Minneapolis-Honeywell Regulator Co.

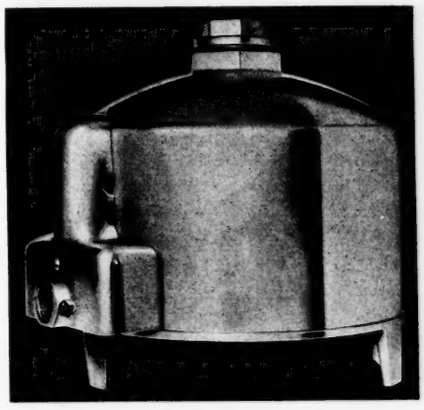


PRODUCT—Gas pilot control—Powerstat.

PURPOSE—To close main gas valve when pilot is extinguished.

OPERATION—Over pilot is horseshoe-shaped element, on inner edge of which flame from pilot plays. Expansion and contraction of this element controls electric circuit, feature being that change in expansion of element functions from difference in temperature between inner edge and outer edge. When pilot is off, same temperature surrounds whole element, while pilot is on, inner edge of element is at higher temperature and maintains circuit which holds main valve open.

MANUFACTURED BY—The Mercoid Corp.



PRODUCT—Viscostat.

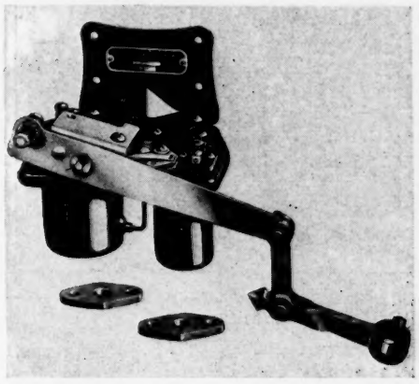
PURPOSE—Automatically regulating viscosity of fuel fed to oil burner, permitting use of heavy oils without carbon deposit.

OPERATION—Connected into the fuel line, heat applied to the oil by a thermostatically-controlled electric heating element. This heating element is located beneath the process chamber, away from contact with the oil, the heat being conducted to the fuel through a radiating plate. A self-cleaning strainer removes dirt and grit from the fuel as the heated oil rotates about it.

SIZES—Two.

CAPACITIES—One model up to 5 g.p.h., another up to 15 g.p.h.

MANUFACTURED BY—Bell & Gossett Co.



PRODUCT—Zone heating control.

PURPOSE—Temperature control by zones for residences, particularly those of large size or rambling layout, and heated by a forced air or air conditioning system.

OPERATION—Thermostat in one room of each zone controls operation of damper motor in the zone duct. Damper motor unit is of thermal motor type, with low-voltage, low-temperature electric heating element in a chamber with a volatile liquid. When thermostat closes circuit, liquid is expanded as current heats it, expanding bellows, thus opening damper. Spring closes bellows when circuit is broken, closing damper.

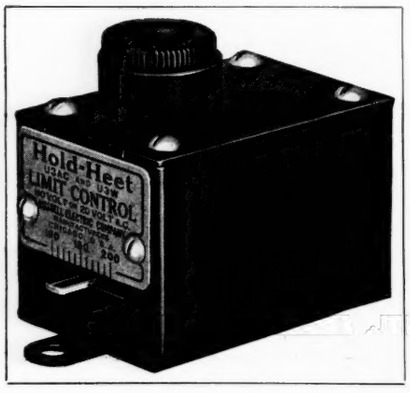
MANUFACTURED BY—Detroit Lubricator Co.

PRODUCT—Damper regulator motor, Type B-22.

FEATURES—The power unit is small four pole induction motor operated at 16 volts. A small power transformer is mounted on outside of

housing and is equipped with cord and plug. Motor is equipped with basement switch by which thermostat may be disconnected and crank arms moved to either "off" or "on" position to facilitate firing.

MANUFACTURED BY—White Mfg. Co.



PRODUCT—Limit switch.

OPERATION—Rated at 15 amperes, 110 volts, a.c. May be used for either line or low voltage applications, is of clamp-on type, and has quick make-and-break action controlled by cobalt steel magnet.

CONSTRUCTION—Switch is of small, compact design and has a differential of 20° with adjustable range of 100° to 200°. It is a 3-wire device, so that by selecting proper pair of terminals it may be used either as limit switch to open circuit on rise in temperature or to close circuit on a rise in temperature.

MANUFACTURED BY—Russell Electric Co.

PRODUCT—Temperature and humidity control.

OPERATION—In thermostat part of control, bi-metallic actuating element tips mercury switch, thus making or breaking the circuit to turn heat on or off. It can be used on either low or line voltage circuits and operates on temperature change of less than 1° above or below setting. The actuating element of humidity control is human hair. This element also tips mercury switch capable of handling either low or line voltage current. Settings for temperature and humidity are made with small knurled knobs on front of instrument.

SIZE—6 × 3 × 2½ in.

RANGE—60° to 80° temperature, 20% to 80%.

MANUFACTURED BY—Minneapolis-Honeywell Regulator Co.

PRODUCT—Refrigerant control valve, Model 73R.

PURPOSE—Control of methyl chloride, freon, and other refrigerants which will not attack materials used in valve. Applications include control of refrigerant to individual evaporator cabinets located in different rooms and working off a central compressor unit.

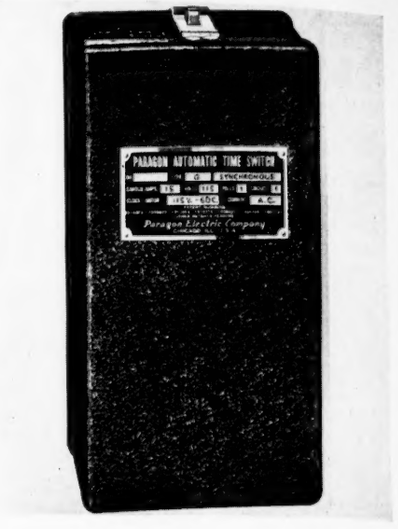
CONSTRUCTION—Valve is of solenoid type. Body is brass forging. Monel metal valve stem closes against alloy seat. Valve stem is opened and closed by action of movable plunger, which is not attached directly to the valve stem but moves a short distance and against momentum before it raises valve stem itself. Coil is completely sealed with plastic material. Cover is black crackle finish. Made in one type, straight-through style.

MANUFACTURED BY—Automatic Products Co.

PRODUCT—Time control, Type G.

PURPOSE—Operating oil burner controls, temperature regulators, stoker controls, and similar equipment for electrical circuits not exceeding 1600 watts.

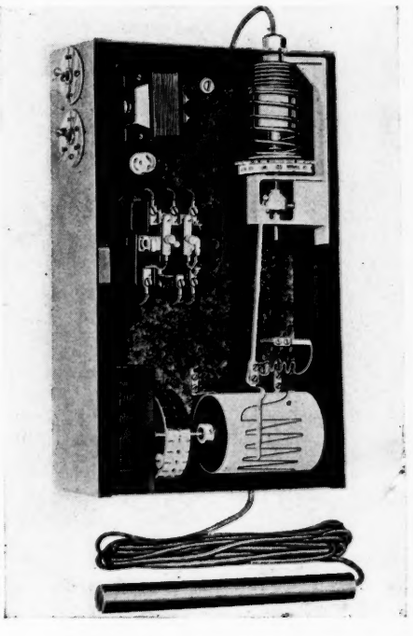
FEATURES—Motor of self-starting synchronous type, self-lubricating, with gears housed in dustproof shell 8 in. high, 4 in. wide, and 3 in. deep. Movement contains four heavy-cut brass wheels and steel pinions. The "on" or "off" circuit can be manually turned at any time ahead of the automatic setting without disturbing the normal sequence of operation. Switch is of molded bakelite and bronze with pure silver contacts. Case is of 16 gauge, pressed steel with nickel-plated hasp and black crackle lacquer finish.



MANUFACTURED BY—Paragon Electric Co.

PRODUCT—Heat regulator—Tritrol.

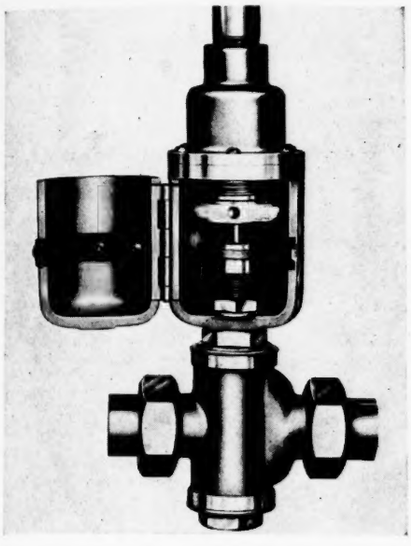
PURPOSE—A thermostatic device which automatically varies time of starting heating system in morning and time for shutting down at night to compensate for changes in outside temperature. During day maintains intermittent flow of heat to building, flow being adjusted according to weather. May be used with oil burners, stokers, gas boilers, district steam, other automatically-controlled sources of heat.



CONSTRUCTION—Consists essentially of outside thermostat, an inside

control cabinet in which is a precalculated and designed drum for the specific installation. Cam, rotated by clock, raises and lowers contact lever according to fluctuation of outside temperature. This lever, contacting shaded portion of drum, completes electric circuit, opening control valve. When contacting unshaded portion, valve remains closed. A compensator is provided by which manual adjustment is made for conditions other than normal and not provided for automatically.

MANUFACTURED BY—Jas. P. Marsh Corp.



PRODUCT—Temperature regulator.

PURPOSE—To prevent frost from forming on valve stem where it enters stuffing box, a condition which causes many regulators to function sluggishly where very low temperatures are maintained, such as in brine-cooled refrigeration systems, cold storage rooms, refrigerator boxes and drinking water cooling systems.

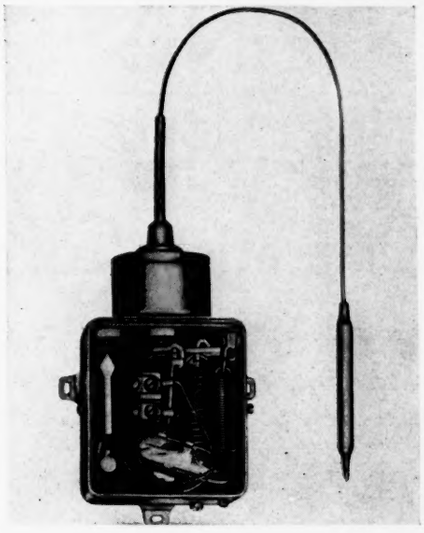
CONSTRUCTION—Provides a metal housing that completely encloses valve stem and packing nut. This enclosure is filled with asbestos saturated with ammonia compressor oil. Construction enables valve stem to work freely when subjected to temperatures as low as 70° below zero.

MANUFACTURED BY—Fulton Sylphon Co.

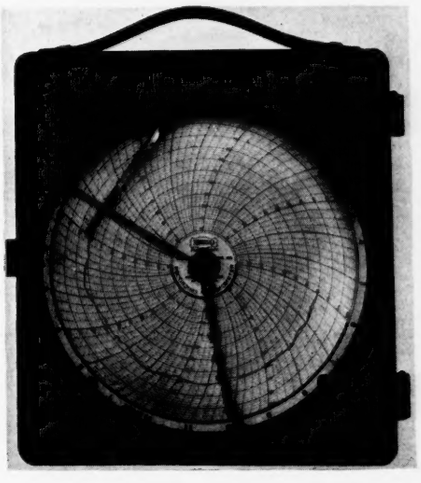
PRODUCT—Compensated humidity control.

PURPOSE—To govern accurately relative humidity at any desired differential between inside relative humidity and outside temperature.

CONSTRUCTION—Consists of two instruments, a modulating or potentiometer type humidity controller operating in conjunction with outside temperature controller of remote bulb type. Humidity controller operates in normal fashion, governing the supply of moisture at desired relative humidity. Normal functions are performed until outside temperature begins to drop. As it drops, remote bulb temperature controller, bulb of which is outdoors, acts as a limit control. As the outside temperature goes down temperature controller affects operation of humidity controller, causing it to call for less moisture and thereby prevent condition of overhumidity.



MANUFACTURED BY—Minneapolis-Honeywell Regulator Co.



PRODUCT—Recording thermometer, Model 500.

PURPOSE—Air conditioning installations.

CONSTRUCTION—Has a 6-in. easy reading, evenly calibrated chart, and is made in both portable and wall-mounting types. Its element consists of a bulb, capillary tube, and a Bourdon tube. Can be equipped with any type of capillary tubing suitable for any particular installation. Charts are available in a wide number of ranges and sub-divisions.

MANUFACTURED BY—Moto Meter Gauge & Equipment Corp.

PRODUCT—Portable Recorder.

PURPOSE—To provide a simultaneous running record of all functions of heating, cooling, humidifying, dehumidifying, and the number and duration of cycles of operation of equipment.

FEATURES—Record inscribed on charts of index file card type. Time coordinates for temperature, humidity, and operation coincide. Provides 30-hr. records. Case has leather handle and unbreakable observation window.

MANUFACTURED BY—Julien P. Friez & Sons, Inc.

BELTING

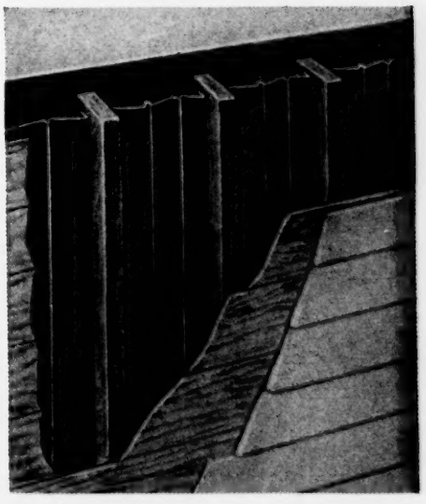
PRODUCT—Belting—Monobelt.

PURPOSE—Designed to meet requirements of high speed devices where small pulley is used resulting in sharp bends of belt.

FEATURES—Uses specially prepared vegetable tanned leather. In single-ply belts leather with a minimum of stretch is used. In double-ply, outer ply is made of more elastic leather. Available in one standard thickness for each width.

MANUFACTURED BY—Alexander Bros.

INSULATION



PRODUCT—Steel thermal insulation.

PURPOSE—Heat insulation for buildings, cold storage applications, etc.

CONSTRUCTION—Consists of parallel spaced metallic sheets with dull surfaces, the sheets having low emission and high reflection coefficients at the frequencies of radiant heat. Thin sheets of commercial black steel are used, formed with angularly arranged surfaces with small ribs at the joints to secure rigidity and eliminate vibration and sound propagation.

MATERIALS—Number of sheets used in an insulated wall may be one or more, depending upon the temperature difference and the degree of insulation desired.

MANUFACTURED BY—American Flange & Mfg. Co.

MODERNIZING SECTION

Private Power Plant for Apartment Cuts Operating Costs

An engineer finds that the high load factor and need for steam and hot water in apartments permit use of simple electric generating plants at a substantial saving

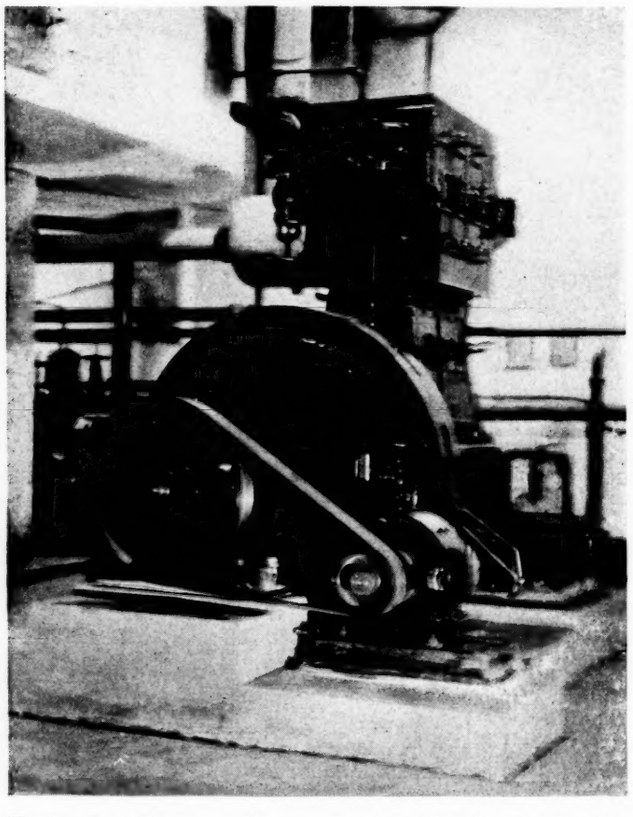
By PERCIVAL R. MOSES†

TWO important real estate ownership and management companies in New York were confronted with the dilemma familiar to all owners of apartment property, namely, decreased rentals, stationary fixed charges, and slowly rising operating expense.

Rentals had necessarily been reduced to a point where receipts barely covered operating expenses, taxes, and a reduced interest on mortgage indebtedness. Invested capital was getting less than no return.

Rising costs of living pointed to probable increased operating costs, and huge relief burdens precluded any reduction in taxes. Even electric rates, because of increased coal surcharges, were rising materially, and the margin between wholesale and retail rates was in process of reduction due to the well-founded agitation for lower domestic rates.

†Consulting Engineer, New York.



Vertical uniflow engine connected directly to electric generator provides electric power

The only feasible way of increasing the returns from the buildings was through reduction in operating expense, as higher rentals were barred by the financial situation and by the competitive market.

Confronted with these problems a careful study of the possibilities was made and as a result a reduction of about 50% in the wholesale cost of electricity has been effected. This was brought about by the installation of single-unit, steam-operated electric generating plants. These plants have been called "one-man power plants" because they are operated by one engineer on a shift. Two of these have now been functioning for a year, and a third has just been put into operation.

The apartment buildings are better-grade houses, 18 stories high, fully equipped. One has 345, another has 287, and the third 224 apartments of one, two, three, and four rooms.

Perfect service and the best possible maintenance kept these buildings 85% filled, notwithstanding the depression. They are now practically full.

Electricity was purchased in bulk at wholesale rates and resold to tenants at retail. Steam was produced (in coal-fired boilers) from No. 2 Buck anthracite, hand fired.

Each of the first two plants consists of a single, oil-fired, self-contained, water-tube steam boiler designed for 200-lb. working pressure and equipped with automatic feed oil control and damper controls. Each boiler is piped to a vertical uniflow steam engine directly coupled to an alternating current, three-phase generator with its exciter and control board.

Under this plan the private plant and utility service are used to the fullest advantage, for auxiliary service is purchased from the utility company under the so-called breakdown or auxiliary service rider.

The Latest Plant

The third house presented a more difficult problem, as direct current electricity was purchased to operate the elevators and alternating current for lighting and

other purposes. Since this house is much smaller than the other two, it was necessary to devise a plant which would be less costly in order to make the savings repay the cost within three years.

This third plant has a coal-fired return tubular boiler with automatic damper control, but hand firing. A vertical uniflow engine is directly coupled to an alternating current generator and connected by multiple "V" belts to a direct current generator and to a direct current exciter.

A Diesel Drive

In a fourth building owned by one of the group where the use of electricity was not sufficiently large to make it possible to install an electric plant and save its cost in three years, a Diesel motor, hung on rubber, has been installed to drive a refrigerating compressor and pump.

This unit will save its cost, including all charges, in between two and three years, notwithstanding the fact that the cost of electricity saved was low because the saving came at the low end of the rate, i.e., 4 cents and 3 cents a kw-hr.

Operation and Service

Operation of all the plants installed has been satisfactory. It is impossible to detect the slightest flicker in the lights as elevators start and stop, although both power and light (in the case of the first two buildings) is supplied by the same electric generator.

The use of motor generators for supplying current to elevator motors, combined with a special exciter design, a sensitive voltage regulator, and liberal feeders, is mainly responsible for this freedom from flicker.

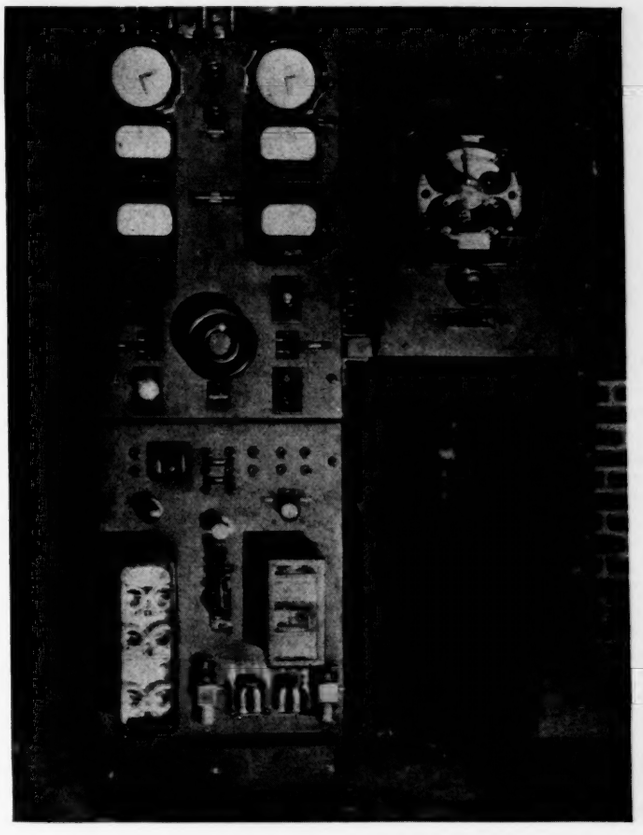
Another problem which had to be solved was to avoid breaking the continuity of service even for a fraction of a second when changing from plant service to outside service. An automatic synchronizing and throw-over device was developed by the engineers in conjunction with the manufacturers and was approved by the engineers of the utility company. Except for a minor difficulty at the start due to a mistake in connections made by the electrician this device has functioned perfectly, and the service is thrown over from plant to outside and back again without stopping a single electric clock.

It is not difficult to imagine what would have happened if the change-over had been made without such a device. Certainly a large proportion of the 300 or more tenants with cheap kitchen electric clocks would have been besieging the office to know why their clocks had stopped.

In one of the plants the matter of ventilation was a serious problem, as there was no satisfactory location for the discharge of the warm air from the engine room. This was solved by inserting a venturi stack into the main smoke stack. The hot air is blown through this venturi stack into the main stack without injuriously affecting the draft.

Noise, Vibration, and Heat Insulation

It was essential to avoid transmission of noise, vibration, pulsation, or heat to the living apartments or public halls. The problem was fully studied and authorities, including the Bureau of Standards, were consulted.



Operating controls are concentrated—these are "one-man" plants

In three of the plants the results are entirely satisfactory, but in the fourth, due apparently to unbalance in the engine operation and to some periodic action or correspondence of periodicity of steam and valves, a serious vibration was set up and had to be minimized by hanging a heavy pendulum weight on the main line. The twin of this plant, as to size and equipment, has caused no trouble, but it seems that some different factor has entered in, which it has not yet been possible to isolate.

The usual precautions such as placing cork, carefully calculated as to strains, under the heavy concrete foundations and the isolation of piping by spring hangers and flexible connections, were taken and these proved effective in all but one case. Even in this one, only one room directly above and adjoining the engine room is affected, but the difficulty is mentioned here because it is one of the most important problems to be solved.

The heat insulation is satisfactory. It is obtained by a combination of hanging ceilings through which air is supplied to the engine room; an exhaust system discharging in one case to an alleyway, and in the other, into the smoke stack, and ample insulation on boiler, piping, and other hot parts.

Spare capacity for the heating system is obtained from low-pressure heating boilers, which were installed when these buildings were built.

(Concluded on page 67)

FHA Insured Modernizing Loans Reach Nearly $30 Million

and industrial firms pledge half billion for plant rehabilitation; single houses account for 70% of modernizing.

DURING the last months of 1934 Washington was more of a source of news of concern to the building industry than it was when the year began, largely due to the activity of the Federal Housing Administration. Principal among the varied news from that city concerning FHA's modernizing drive and other more recently begun activities were the following:

1—67,369 loans were made under the modernizing credit plan up to December 21, and the total amount of credits advanced to $28.2 million. This is an increase of $1.7 million over the previous week.

2—In response to inquiries by Federal Housing Administrator Moffett a group of large industrial concerns reports plans for plant improvements which will total half a billion dollars in 1935.[1]

3—Single-family homes account for nearly 70% of the modernizing being done, followed by 16% for multiple-family dwellings.

4—173 financial institutions have been approved as mortgagees under Title II of the Housing Act, with 69 others pending, and 340 considering applications. These figures are as of December 11.

5—Appointment of a Housing Advisory Council of FHA December 16.

6—General improved financial conditions for the farmer have caused a renewed interest on his part in his home with the result that farmers are making use of the modernizing credit plan.[2]

Modernizing Campaign

The Administration estimates that the spending of $179 million for modernizing work has been stimulated by its drive up to December 21. According to the Administration this work amounts to nearly $15 million per week. The loans actually insured by FHA are averaging about $2 million per week, indicating that for every dollar loaned under Title I, six other dollars have been invested by private capital without using the government-backed plan.

This business is reported as largely the result of the 3550 community campaigns under way. Of these, 1285 are engaged in house-to-house canvassing and 166 towns have completed canvassing.

A total of 11,735 banks have been approved as lending institutions under Title I up to December 18 with this number increasing at the rate of 50 per day.

[1]Including $200 million by A. T. & T.; $40 million by U. S. Steel; $73 million by Standard Oil of N. J.; $25 million by Bethlehem Steel; $19 million by Ford; $5 million by American Radiator, and $12 million by National Steel.

[2]With loans averaging $500 per family borrowing.

Reports from the field, but not through the Federal Housing Administration, indicated a wide variation in results from individual cities.[3] Atlanta reports 75% of applications rejected and only 300 loans made (for about $300,000) through October 1, while Pittsburgh reports that one bank alone has 300 applications and approved a substantial proportion. Of $1 million spent in Boston for alterations between August 11 and October 16, less than 10% was borrowed. In Chicago five out of six who are modernizing do not require loans. The survey showed that really excellent progress has been made by FHA with increasing cooperation by the banks, but a need for much stronger FHA publicity.

The following table shows the distribution of insured loans by type of property, as analyzed by the FHA, as of November 21:

Type of Property	Amount	Percentage
Single family	$13,181,376.41	69.87
Multiple family	3,024,021.84	16.03
Apartments	1,076,536.99	5.71
Farm buildings	441,937.18	2.34
Garages	78,711.09	.42
Office buildings	134,419.82	.71
Stores	441,282.31	2.34
Factories	81,067.80	.43
Warehouses	33,937.44	.18
Others	371,401.46	1.97
	$18,864,692.34	100.00

Housing Advisory Council

The appointment of a Housing Advisory Council was announced December 16. This council is composed of representative men who are authorities in the seven broad functions of the Federal Housing Administration: Design, construction, materials, labor, city planning, housing, and finance. Membership in the council consists of 25 men, who are expected to hold full committee meetings on the average of two days a month, with more frequent meetings of the various sub-committees. Although they are expected to devote considerable time to the deliberations of the council, many of them have consented to serve without remuneration.

Included in the membership are: Robert J. Barrett, executive director of the Plumbing Contracting Division of the Construction Industry; Rolland J. Hamilton, president, American Radiator Company; Lewis H. Brown, president, Johns-Manville Corporation; M. J.

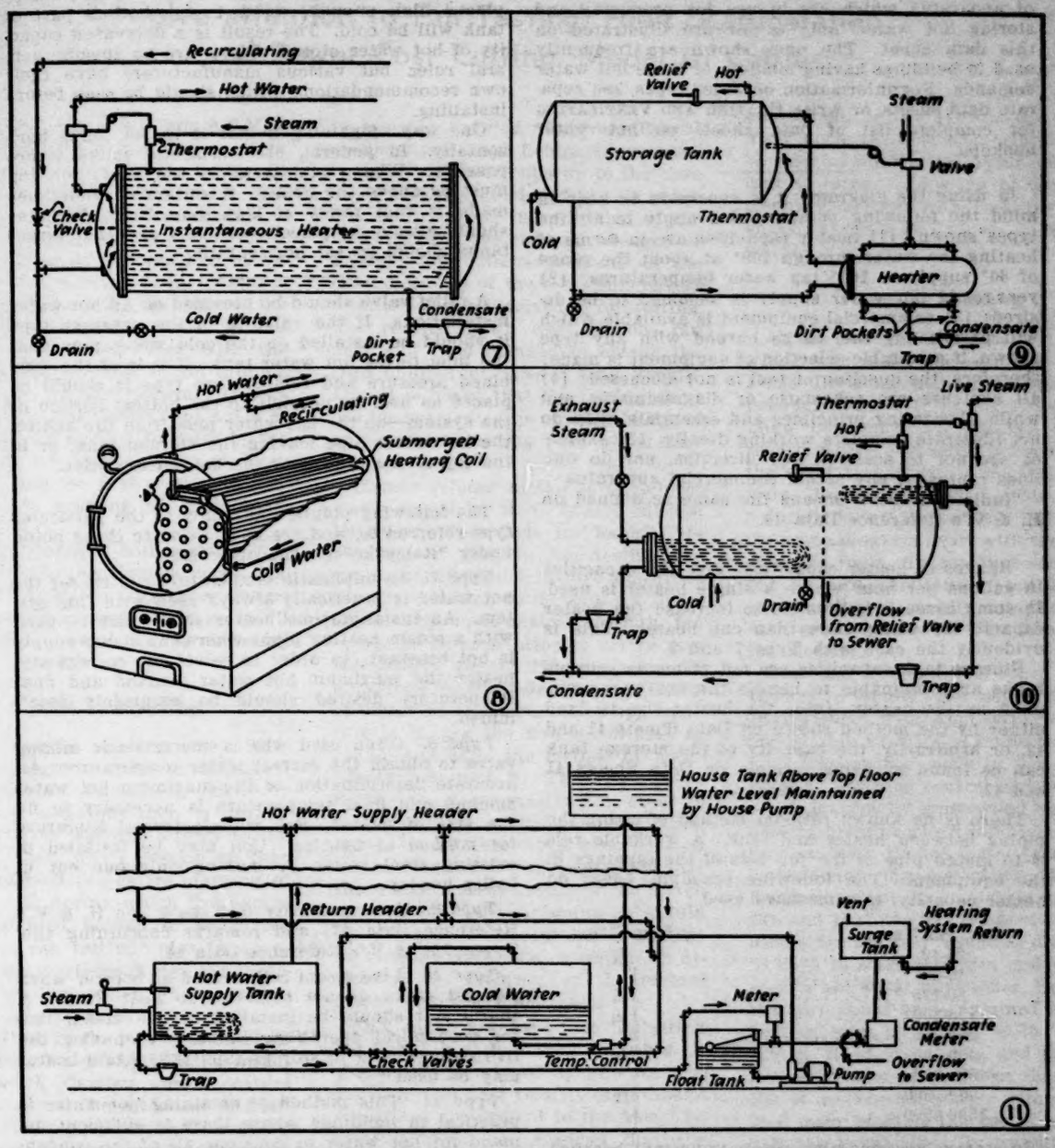
(Concluded on page 67)

[3]From a survey by Wolcott & Holcomb, Boston advertising agency and merchandising counsel, as reported to the Air Conditioning Bureau of Boston.

HOT WATER SUPPLY DATA—3

Diagrammatic connections of hot water supply systems

Buildings having medium or large hot water demands



TYPE 7: HEATED BY STEAM, INSTANTANEOUS, NO TANK.

Typical Application: Any size water demand, where water demand is fairly steady and a plentiful supply of steam is available at all times.

Range of Heater Capacities (gal. per hr.): 100-20,000.

Remarks: Can be used with either steam or hot water. A plentiful supply of steam is an absolute necessity at all times.

TYPE 8: HEATER SUBMERGED IN BOILER WATER, INSTANTANEOUS, NO TANK.

Typical Application: Medium water demand, dependent on heating plant and maintenance of minimum water temperature or steam pressure.

Range of Heated Capacities (gal. per. hr.):

Remarks: Coil is usually of copper or brass. Commonly uses limit control to keep water temperature at about 180° or pressure control to maintain minimum steam pressure.

TYPE 9: HEATED BY STEAM, INDIRECT HEATER, STORAGE TANK.

Typical Application: Any water demand, dependent on supply of steam.

Range of Heater Capacities (gal. per hr.): 40-20,000.

Remarks: Requires a year-round source of steam. May use either exhaust or live steam. It would also be possible to use hot water in the heater.

TYPE 10: HEATED BY STEAM, COMBINED TANK AND LIVE AND EXHAUST SUBMERGED STEAM COILS.

Typical Application: Any water demand, dependent on supply of steam.

Range of Capacities (gal. per hr.): 100-20,000.

Remarks: Exhaust heater coil is usually used to heat water in tank. When an insufficient amount of exhaust steam is available the tank thermostat admits high-pressure steam into the small coil.

TYPE 11: STEAM CONDENSATE USED FOR HOT WATER, AUXILIARY STEAM COIL, TANK.

Typical Applications: Medium and large water demand.

Range of Capacities: See other side of sheet.

Remarks: Because of complexity and original cost, used only in large buildings. Live steam is used for heating water when not enough condensate is available.

HOT WATER SUPPLY DATA—3

Diagrammatic connections of hot water supply systems

Buildings having medium or large hot water demands

Of the many types (and combinations of types) of apparatus which are in use for producing and storing hot water, only a few are illustrated on this data sheet. The ones shown are frequently used in buildings having medium or large hot water demands. For information on other types, see separate data sheets, or write HEATING AND VENTILATING for complete list of data sheets on hot water hookups.

In using the diagrams it is necessary to keep in mind the following points, which apply to all the types shown: (1) heater capacities are in terms of heating the water through 100° at about the range of 60° supply to 160° tap water temperatures; (2) year-round hot water supply is assumed to be desired; (3) commercial equipment is available which will permit any fuel to be burned with any type shown, if a suitable selection of equipment is made; therefore, the question of fuel is not discussed; (4) all sketches are schematic or diagrammatic, and while illustrating principles and essentials, they do not illustrate complete working details; (5) sketches are not to scale in any direction, nor do outlines represent any actual commercial apparatus.

"Indirect Heater" means the same as defined on H. & V.'s Reference Data 44.

"Ranges of heater capacities" give the capacities in gallons per hour where a single heater is used. In some cases it is possible to increase the heater capacity by using more than one heater. This is evidently the case with Type 7 and 9.

Storage tank capacities are not given, as suitable tanks are obtainable to handle the hot water supplied by the heater. Once the heater size is fixed either by the method shown on Data Sheets 41 and 42, or arbitrarily, the capacity of the storage tank can be found by using formula on Data Sheets 41 and 42.

There is no known rational method of sizing the piping between heater and tank. A workable rule is to install pipe of the full size of the tappings in the equipment. The following schedule, based on heater capacity, is sometimes used.

GAL. PER HR.	PIPE SIZE
25-40	¾
40-80	1
80-125	1¼
125-200	1½
200-350	2
350-500	2½
500-800	3
800-1500	3½
1500-2000	4

In storage systems pipe size is important because it influences temperature of the water in the tank, especially where the heater is external to the tank. The larger the pipe size, the less the frictional resistance and the faster the flow becomes. The faster flow results in a lower temperature rise. The tendency is for the whole tank to be filled with warm water. With small pipes, rate of flow is restricted, temperature rise is increased, and a layer of hot water is stored in the top of the tank.

In fitting pipe, the usual rules should be followed, especially in allowing for adequate expansion of the piping and for sloping toward drain points.

In planning a storage installation the height of the tank above the heater is important. The higher the tank can be set the greater head there is for circulation. This tends toward fast circulation with low temperature rise. To balance this, small pipe sizes can be used.

Additional point about tank height is that unless placed high enough, water in the bottom part of tank will be cold. The result is a decreased capacity of hot water stored. There are no specific general rules but various manufacturers have their own recommendations, which should be seen before installing.

One way of gaining height is to set tanks horizontally. In general, use horizontal tanks where possible. When vertical tanks are used, the top must be above the heater. A statement sometimes made is that tanks of less than 20-in. diameter should always be placed vertically and that larger tanks should be set horizontally.

A relief valve should be provided on all hot water installations. If the valve is of the pressure type it should be installed on the cold water pipe near the inlet to the hot water tank. If it is of the combined pressure and temperature type it should be placed as near as possible to the hottest portion of the system—on the hot water pipe from the heater, the hot water pipe leaving the storage tank, or in the top of the tank near the hot water outlet.

The following points apply only to the particular type referred to, and are in addition to those noted under "Remarks" on the other side.

Type 7. An automatic temperature control for the hot water is practically always used with this system. An instantaneous heater should not be used with a steam heating plant where the steam supply is not constant. In order to select the correct size heater the maximum hot water demand and final temperature desired should be accurately determined.

Type 8. Often used with a thermostatic mixing valve to obtain the correct water temperature. An accurate determination of the maximum hot water demand and final temperature is necessary to fix the size of heater. See manufacturers' literature for method of figuring. Coil may be installed in existing steel boiler by making only one cut in boiler header.

Type 9. Note similarity to Type 5 (on H. & V.'s Reference Data 43) and remarks concerning this Type of H. & V.'s Reference Data 44.

Type 10. Live steam coil is used as booster when exhaust steam is not sufficient to heat water. A thermostat should be installed in live steam line for economical operation. In place of having the live steam heater in storage tank, a separate heater may be used.

Type 11. This method of obtaining hot water is practical in buildings where there is sufficient demand for hot water to consume all of the condensate. The heating system's condensate enters the float tank after passing through a surge tank and condensate meter. When the chamber is full the float switch starts the pump which forces the water to the hot water supply tank. As the hot water is pumped into the supply tank it forces the water up through the risers into the supply header and then to the return header. It flows into the cold water tank, driving the cold water out and into the elevated house tank. When the hot water reaches the water temperature control in the pipe to the house tank, the pump is stopped. Any excess condensate flows through the drain to the sewer.

When there is a demand for hot water in the building, it is supplied from the hot water storage tank and in turn from the cold tank. When there is not sufficient condensate to supply the hot water demand, steam enters the heating coil in the hot storage tank and cold water is supplied to the house tank by a pump.

A.S.M.E., A.S.R.E. Meetings and Power Show

give attention to Fan Testing, Fuels, Refrigeration and Power Cost Cutting. Medal to Carrier.

MEETINGS of A.S.R.E. and A.S.M.E. together with the Power Show, all in New York, have occupied the first week in December for so many years that their place on the month's schedule is almost automatic to many society members and to those interested in power equipment. This year was no exception and those who tried to follow the progress of the events in three different places at once were faced with the usual problems of how to get around. As early as Sunday morning, December 2, preliminary meetings of A.S.M.E. committees got started, followed by the opening of the Power Show on Monday noon and the first session of A.S.R.E. on the morning of Wednesday, December 5.

Since programs of both societies carried practically continuous social features and inspection trips there was no room in most schedules to take in all events and, as usual, it was necessary to be very selective.

A. S. M. E. Meeting

At its annual meeting—the 51st—A.S.M.E. papers on subjects of interest to heating and ventilating engineers were more numerous than is usually the case. This was due largely to the fact that there was a session on fans which occupied the entire morning of Tuesday and during which five papers were presented having to do principally with fan testing; also to a session Tuesday afternoon devoted to domestic heating, when three papers made up the program

In addition to the papers themselves the presentation of the A.S.M.E. medal to Willis H. Carrier was a feature which attracted the attention of heating and ventilating people. The award took place at the annual dinner on Wednesday evening. This recognition of the work of Mr. Carrier is well merited and the award of the medal to him is a source of pleasure to his many friends and acquaintances.

Session on Fans

Attention on the part of the A.S.M.E. to the subject of fan testing is relatively new. Sub-committees have been at work for some time on drawing up test codes for various kinds of power equipment. Among these is fans. A year ago the sub-committee proposed a test code for fans to which there were objections and differences of opinion. A fan research laboratory at Lehigh University has been established to study some of the points about which there were difficulties. W. E. Somers in a paper entitled "Progress Report on Fan Research at Lehigh University" summarized the results up to the time of the meeting. Included in this paper are results of an investigation of the effect of the presence or absence of straight inlet discharge ducts on the characteristics of the fan. This covers technical points involved in fan testing. The results shown were for one fan only and it is planned to extend the tests to different types of fans. Eventually, it is hoped that the testing plant can demonstrate the practicability of any proposed testing code which may be suggested.

Closely related to the same subject was a report by M. C. Stuart entitled "Status of Test Code for Fans." He pointed out that in fan testing the measurements which involve difficulties are those having to do with air quantity and the head against which the fan operates. In attempting to arrive at a satisfactory method for measuring air quantities he suggested the possibility of either of two methods of approach. One is to use the flow conditions as found, and build the method of measurement around it. The other is to modify the flow conditions in order to meet the requirements of the measurement. He felt that actual measurement of pressure is not troublesome but that the exact measurements to be taken and the locations for doing so should be specified. The paper indicated that in revising the code, research to determine the accuracy of the several points would be undertaken.

In a paper under the title "Pulsating Air Flow" Neil P. Bailey described an instrument developed by him for giving an average air velocity even though pulsations are present in the flow. The instrument is so arranged that the air velocity creates a water velocity through a submerged orifice, and as this water velocity is always proportional to the air velocity the water velocity can be used to determine the average velocity of the air flowing, regardless of the amount of pulsation.

As the result of a study made by Lionel S. Marks and reported in his paper "Air Flow in Fan-Discharge Ducts," the author recommended that for test purposes the term "velocity head" should be redefined and that a more precise specification for the Pitot tube should be adopted.

N. C. Ebaugh and R. Whitfield gave results of laboratory tests made by them to determine the characteristics of large thin plates and orifices mounted on the intake end of a pipe, when only small differences in pressure are present on the two sides of the orifice. They suggested that such orifices could be used for fan testing. Tests indicated that an intake orifice can be used as a metering element with pressure differences as small as 0.05 of an inch of water.

Domestic Heating

At the session on domestic heating which was under the auspices of the Fuels Division, attendance was surprisingly large. It is not possible to know how much of this was due to reports which circulated beforehand to the effect that many of the discussers were "loaded for bear." This would naturally follow where three papers on the same program dealt with the three domestic fuels. To say that each fuel has its own partisans is putting the case mildly. A goodly number from each group seemed to be on hand for the meeting.

Coal had its turn first when M. K. Drewry presented his paper entitled "Experiences with Application of Central Station Practice to Domestic Heating." The author outlined his experiences in applying central station practice to a specially constructed residence heating plant in which solid non-caking fuel was used. He had found an average boiler plant efficiency of 90% for the heating season by maintaining 10% CO_2 and 160° flue gas temperature. He used a fire the year 'round in order not to have to start new fires and to heat service hot water in summer. He found that fire could be maintained at combustion rates as low as ¼ lb. of fuel per sq. ft. of grate area, and an overfire air temperature of less than 200°. Use of an external hopper with gravity feed made possible the use of a boiler half the usual size. By watching the fuel bed an average loss of less than 1% in the refuse was obtainable. In addition, he listed other experiences of a rather unusual nature.

Oil as a domestic fuel was discussed by L. E. Seeley. His paper, "The Efficient Application of Oil Burners and Boilers to Domestic Heating," contained a resumé of the author's findings in connection with his testing work on oil burners. He pointed out the necessity of carefully estimating the gross load; discussed the relation between this gross load and the type of burner operation, namely, whether intermittent or steady. As a result of these various considerations he explained that in terms of heating surface one boiler might be almost three times the size of another in order to handle the

(Concluded on page 66)

Warm Air Furnace Men Meet,

reelect Richardson, express satisfaction with codes, plan to study oil burning in furnaces, hear research papers

THERE were three outstanding features of the annual convention of the National Warm Air Heating and Air Conditioning Association held at the Hotel William Penn, Pittsburgh, December 5-6. Noteworthy was the enthusiasm of those attending in the future of warm-air heating, particularly forced warm-air heating, the excellence of the technical papers presented, and the general belief that the codes covering the warm-air industry and its branches have been beneficial in clearing up competitive conditions in general.

H. T. Richardson, vice-president of Richardson & Boynton, was reelected president of the association as were the other officers, including W. L. Rybolt, first vice-president, and L. R. Taylor, second vice-president.

A. O. Eberhart, of the Federal Housing Administration, addressed the opening session on the government's housing program. Mr. Eberhart explained the results that have been obtained from government modernizing program under Title I of the National Housing Act, and told what Titles II and III are expected to accomplish. He urged that each man in the industry consider that it was his personal responsibility to aid in this campaign.

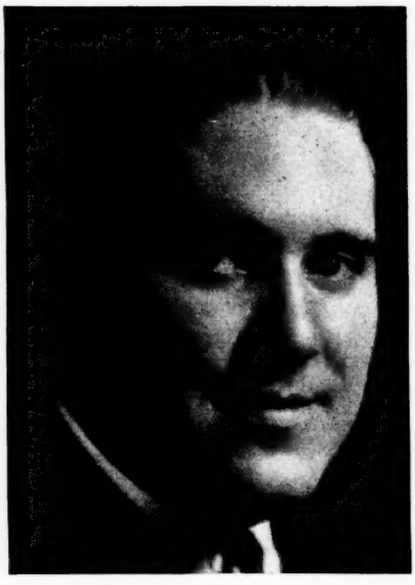
J. Earl Maynard, chief heating engineer, Fox Furnace Company, presented a paper entitled "Layouts for Air Conditioning including Mechanical Heating." He urged that engineers be particularly careful in designing forced warm-air systems during the present period when the public is forming its impressions of this type system. In larger residences he recommended that a safe limit of velocity would be 800 f.p.m. in main ducts and 600 to 700 f.p.m. in branches, while air velocities through registers should not be over 300 f.p.m. for baseboard registers, and 500 to 800 f.p.m. for high up registers.

In general Mr. Maynard recommended baseboard registers for supply, except in bath rooms. Here, due to evaporation of moisture from the body after bathing, air motion is not desirable so that the speaker recommended a 6½-ft. level for the supply register.

When returns are placed on the second floor the speaker suggested that these be placed as far from the stairs as possible so that the air will not follow the line of least resistance and flow down the stair well, and that the supply should be near the bedrooms having warm air supply.

J. H. Van Alsburg presented the report of the technical educational committee. He informed the convention that a short course in warm air heating will be held at Michigan State College, East Lansing, Mich., beginning March 13, 1935. The course will call for instruction in the fundamentals of heating, calculation from blueprints for heating systems, together with duct and register layout.

W. C. Markle, chairman of the Code Authority for the Roofing and Sheet Metal Contracting Industry, was next on the program.



H. T. Richardson, reelected president of the National Warm Air Heating and Air Conditioning Association.

Mr. Markle mentioned the difficulties encountered in drawing up the NRA Code for this industry which covers roofing and warm-air heating and waterproofing. Mr. Markle pointed out that the Standard Code is included in the NRA code.[1]

Prof. J. D. Hoffman, who was scheduled to talk on the industry's installation codes, was unable to be present due to illness.

At the afternoon session, December 5, Beverly S. King, deputy administrator of NRA at Washington, spoke of the cooperation he has received from various branches of the warm air industry. He urged that the idea of a basic code administered by one code authority for all branches of the heating industry would have two advantages: (1) It would reduce tremendously the work and expense involved in administering the code, and (2) it would further solidify the organization of manufacturers and other employers so that they would be better able to deal with labor organizations.

Mr. King mentioned difficulties which manufacturers have had in distinguishing between jobbers and dealers and suggested that it might be well not to attempt to define a jobber, but rather to distinguish between different jobbers. In speaking of the difficulty of obtaining compliance, he said that 85% of all complaints are handled by the trade practice complaints committees of the various codes.

A. W. Wrieden, of the Warm Air Furnace Manufacturing Code Authority, read to the meeting the questionnaire he had recently sent to members of his industry, and summarized the replies he had obtained. The majority replying to the questionnaire believed that NRA has benefited the industry, that NIRA should be continued after it expires in June, 1935, and that the warm-air furnace code specifically should be continued. Mr. Wrieden gave it as his personal belief that the open price policy had met with general approval in the industry and that the code had eliminated many past abuses. He stated that the biggest problem now faced by the furnace manufacturing industry has to do with the determination of the classification of dealers and jobbers by the manufacturer in order to determine in which customer class buyers fall.

R. W. Blanchard, of the Code Authority for the Register Manufacturing industry, said that his industry's code is fair, although not entirely complete. He said that this industry is small, in that there are not many manufacturers, and expressed appreciation of the cooperation of the Washington officials in formulating their code. He gave as his opinion that the inclusion of the terms of sale were a desirable feature of the code and agreed with Mr. Wrieden that the classification of customers was difficult.

In the absence of E. S. Moncrief the report of the furnace pipe and fittings industry was presented by A. W. Williams, secretary of the association.

Following the discussion of the codes F. C. Houghten, director of the

(Concluded on page 59)

[1]The speaker refers here to the standard code regulating the installation of gravity warm-air heating systems in residences. This code was embodied in the Roofing and Sheet Metal Code with the exception of Article V, page 19, of the standard code which was omitted on the basis that the installer could not legislate for the owner.

NEWS OF THE MONTH

New Oil Burner Code Authority Gets Under Way at Meeting December 3; Marr a New Member

WASHINGTON—The new Oil Burner Code Authority met at the Department of Commerce Building, December 3, with president A. J. Fleischmann, May Oil Burner Corporation, chairman of the authority as presiding officer. Arthur W. Clark, executive director of the National Oil Burner Dealers Association, was elected temporary secretary, with the understanding that he was to serve without compensation and only until such time as the code authority is in a position to engage a permanent secretary.

For the first time in the history of the authority there were present five representatives of the NRA. They spent the greater part of the day with the code authority in cooperating with them to bring about their program.

The code authority voted to amend the constitution and by-laws of the Oil Burner Code Authority, subject to the approval of the National Recovery Administration, changing their headquarters from New York to Washington, D. C., at a place to be selected later.

Several amendments were proposed to the code for the oil burner industry, to correct certain wordings in the code and to eliminate from the code certain references to distillate burners, now under another code. These amendments were approved by the code authority and presented to NRA for approval and will be released for publication in detail, as soon as this approval has been received from NRA. One of the amendments proposes to substitute for the cost provisions of Article V of the code an amendment that will, if approved by NRA and adopted by the industry, definitely provide a yardstick for measuring below cost selling, designed to prevent destructive price cutting in the industry.

To fill a vacancy in area 1, manufacturer's representative, Earl Marr, representing Franklin Oil Heating Company, was elected a member of the code authority, subject to the approval of NRA.

The code authority approved a budget that was to be presented to NRA for approval, which will provide money for the activities of the authority, under a levy system which has been figured at a low rate. If the budget is approved, according to the present plans of NRA, it will provide for some of the inequalities that were found under the old code in the budget.

The following were present:

D. J. Murphy, assistant deputy administrator; Maurice Judd, assistant to division administrator Barton W. Murray; W. W. Swift, representing legal division, NRA; Saul Nelson, representing research and planning division, NRA; and V. O. Chase, aide to Beverly S. King, deputy administrator, NRA.

The following members of the code authority were present or represented: A. J. Fleischmann, chairman, manufacturer member; M. M. Oppenheimer, dealer representative; Werner Schwan, representing Ray Porter, dealer member; J. A. Lattner, manufacturer member; Alfred Buckley, dealer member; A. Michaels, dealer member; and P. S. Lyon, representing J. J. Donovan, manufacturer member-at-large.

Also present were: Arthur W. Clark, executive director, NOBDA; C. F. Curtin, acting secretary, AOBA; H. F. Tapp, assistant to president, Gilbert & Barker Manufacturing Company; and John Lord, attorney.

Oil Up 1/4 Cent

NEW YORK — Standard Oil Company of New Jersey announced a ¼ cent increase per gallon on all of its various fuel oils in the eastern markets, tank car lots, effective November 26.

NEW YORK—Effective December 7, Standard Oil Company announced an increase of ½ cent per gal. in the tank car and terminal price of Esso Heat light (heating oil No. 1). Price is now 5¾ cents per gal. at New York, Baltimore, Charleston, and Norfolk.

BALTIMORE—Effective December 10, terminal and tank car price of industrial fuel oil here was reduced by ½ cent to 4½ cents per gal. by Standard Oil Company of New Jersey.

NEW YORK—Standard Oil Company of New Jersey increased its price of Esso Heat light fuel oil No. 1 ¼ cent per gal., effective December 22. The increase applies to New York, Baltimore, Norfolk, and Charleston.

Hudson Bay Co. Sells Small Burners

SPRINGFIELD, MASS. — Petroleum Engineering Corp., 330 Dwight Street, reports a broadening of its markets for range oil burners hitherto confined largely to New England. Shipments are being made to Pennsylvania, Illinois, Florida, and other distant states, and a contract is reported to have been signed with the Hudson Bay Company to handle the company's lines in northern Canadian outlets.

Trade Commission to Study Standard Oil's Burner Activities

WASHINGTON—A Federal Trade Commission inquiry into the sale of oil heating equipment by the Standard Oil Company of New Jersey got under way in that company's territory in mid-December. The investigation, started at the request of the National Oil Burner Dealers' Association, is to determine whether the company is violating anti-trust or fair-trade practice regulations in offering a burner and a 550-gal. tank to consumers at a price averaging around $285.

The industry has become interested in the investigation which is looked upon as a test of the oil companies' right to enter the equipment field. The dealers' group charges that independent dealers will be forced out of business if other oil companies follow the lead of Standard and market burners.

New Fuel Oil Standards Effective Feb. 15

WASHINGTON—The third edition of the Commercial Standard on Fuel Oils will be effective February 15. The new standard, No. CS12-35, has been accepted by the majority of the industry.

According to I. J. Fairchild, chief, Division of Trade Standards, Bureau of Standards, Department of Commerce, "It may be well to note that although in the light of experience in the last heating season, the revision closes the major loopholes for unfair competition, there is ample evidence of the need for additional information and activity toward the better adaptation of fuel oils and burners to each other."

Oil Sales Up in '33

PITTSBURGH—There were 34,140,000 barrels of fuel oil sold in 1933, an increase of 16.7% above the 1932 sales, according to the United States Bureau of Mines.

New A. C. Jobs for Chicago

CHICAGO—Work has been started on remodeling the three upper floors of a four-story building at 16-18 South Clark Street into elaborate air conditioned quarters for the Chicago Loop Orthodox Synagogue, at an estimated expenditure of $50,000.

The University of Chicago will remodel the one-story structure at East 63rd and Ingleside to accommodate four stores which will be the first on East 63rd Street to be completely air conditioned.

Discount on A. C. Power Rates

SAN FRANCISCO — Customers of the Pacific Gas and Electric Company in northern and central California using electrically-operated air conditioning equipment and other electrical appliances will receive 50% discount on the excess of their bill over last year's. For one year, beginning immediately after December meter readings, there will be a 50% discount on the amount by which the bills of residential and commercial customers in any month exceed their bills for the corresponding month of the preceding year. For example, a consumer who used $3 worth of current last January may use $5 worth this January yet pay only $4 for it. In other words, he will get $2 worth of electricity for $1.

"This special rate," says M. P. Downing, vice-president and general manager of the Pacific Gas and Electric Company, "is possible because there is a large surplus of electrical power in northern California. We wish to give our residential and commercial consumers the benefits of this surplus —to enable them, at exceptionally low cost, to enjoy many more electrical conveniences and comforts."

I.C. Conditions More Cars

CHICAGO—Upon completion of Illinois Central System's air conditioning program for 1935 it will have thus equipped 51 Pullman sleeping cars, and 41 railroad-owned cars, including 18 dining cars, 13 lounge cars, 5 parlor cars, and 5 coaches. The 41 coaches above mentioned do not include the 5 cars in the streamlined train, recently ordered by the road, to be air conditioned throughout.

ST. LOUIS—Air conditioning equipment is to be installed in all passenger cars of the Missouri Pacific Lines by next summer. It is estimated the work will cost approximately $600,000 for the 195 cars.

New Dealers in Connecticut

NEW HAVEN—Gus A. Regnier Refrigerating Company has been formed here with offices at 187 Olive Street. Authorized capital of the corporation is $50,000. Incorporators are August A. Regnier and Malcolm and Samuel Zimmerman. The firm will sell and install all types of air conditioning and refrigerating equipment.

HARTFORD—New showrooms at 364 Asylum Street have been opened by Mayflower Sales Company, dealer in oil-fired automatic heating equipment. The company has been located for several years at 14 Haynes Street. Officers of the firm include Nicholas B. Francis, president and treasurer, and Alex. W. Creedon, secretary.

Kelvinator Conducts Air Conditioning Schools

DETROIT—Kelvinator Corporation began on December 10 the second of its current series of air conditioning engineering schools. The first 10-day course was concluded November 28. A third has been announced for January 14-25. The courses are attended by men representing the application engineering departments of the company's distributorships.

Most of the material covered is of an advanced nature, previous experience in heating, ventilating, or air conditioning work being a prerequisite to entrance. M. C. Terry, manager of the commercial applications department, was in charge of the first 10-day school. Lectures on theory and application of air conditioning were given by C. L. Toonder, of the department's air conditioning engineering staff. Others addressing the sessions included C. VanMannen, automatic heating manager; H. M. McGaughey, of the company's service department, who spoke on servicing and installation, and A. F. Knapp, development engineer, who discussed design features and development engineering.

Harbula Handles A.C. for Pixley

CHICAGO—Air conditioning for nine restaurants, a theater, and two residences are included among recent projects on which M. G. Harbula and Associates have been retained as consulting engineers. Of special interest is the case of the Pixley & Ehlers restaurant chain. This firm conditioned five of their restaurants in the past two years and the installations were so satisfactory that seven additional restaurants in Chicago are now being conditioned as well as the residence of Mr. Pixley at River Forest, Ill.

Work on this string of restaurants started in the fall instead of in the spring as is usually the case with cooling jobs. Other projects are the Milford Theater, Harding's Restaurant, and two restaurants for the Younkers chain.

40 Stokers Sold in 45 Days

DENVER — McCarty-Johnson Heating and Engineering Company here has installed 40 stokers in the 45 days since it assumed the Denver Combustioneer agency.

Seattle Dealer Moves

SEATTLE—General Air Conditioning Company, headed by Fritz Hellenthal, has moved to new quarters at 1209-11 Second Avenue, where a display and demonstration of air conditioning equipment will be featured.

Heating, Ventilation, Necessary in Stores

STATE COLLEGE, PA.—Paul H. Nystrom, market analyst, said that proper heating and ventilation is a fundamental requirement of a retail store. Doctor Nystrom was speaking at the Fourth Annual Retail Conference held here recently.

According to the speaker the requirements of retailing are much the same regardless of the type of ownership and in their simplest terms are as follows:

(1) A good location; (2) a suitable building; (3) layout and equipment that help to sell goods; (4) adequate lighting, heating, and ventilation; (5) order and cleanliness; (6) merchandise which people want; (7) effective display of goods; (8) intelligent salesmanship and service that sells and makes friends; (9) advertising that brings customers to the store; (10) reasonable prices that customers are willing to pay.

Contract Let for Denver's "Radio City"

DENVER—A $9,000 contract for heating the completely remodeled five-story Paris building, which will be known as "Radio City" when it is finished, and ventilating the three floors occupied by KOA, broadcasting company of the NBC network, was recently awarded jointly to the McCarty-Johnson Heating and Engineering Company and the Johnson-Davis Plumbing and Heating Company.

A feature of the ventilating system will be soundproofing the studios and control rooms.

Coal Dealers Advertise Cooperatively

BOSTON—More than 100 coal dealers in metropolitan Boston and New England have undertaken a cooperative advertising campaign to run for 18 weeks in a Boston morning newspaper.

Copy will feature the advantages of anthracite as a modern fuel. The Anthracite Institute is participating in the campaign.

Jersey A.C. Concerns Formed

NEWARK, N. J.—The Bentz Air Conditioning Corporation has been chartered here with a capitalization of $125,000. William H. Campbell, Jr., is registered agent.

Automatic Controls, Inc., Newark, to manufacture heating controls, has been granted a charter and authorized to capitalize with 1000 shares common, no par value. A. King Braelow is registered agent.

Committee of Ten Discusses Consumer at Annual Meeting; Cosgrove is 1935 Chairman

CHICAGO — Mr. and Mrs. Consumer were just about the most talked-of persons in the country at the third annual meeting of the Committee of ten, Coal and Heating Industries, held November 27 at the Medinah Club, Chicago. Ways and means of furthering consumer satisfaction with solid fuels was the theme in practically every talk made by many leaders in the coal and heating equipment industries who attended the all-day session presided over by J. C. Cosgrove, chairman of the committee and representative of the National Coal Association. Approximately 50 representatives of the various branches of the solid fuel and related equipment industries attended the conference.

The work of the committee during the past year was endorsed and at the same time urgent pleas were presented by representatives of some of the related groups and others in attendance for expansion of the activities and for financial support to make such an enlarged program possible. In his report, Chairman Cosgrove briefly sketched the activities of the committee since the last annual meeting in June, 1933, and reviewed the work and accomplishments of the committee since it was organized a few years ago.

A resolution was unanimously approved endorsing the research program of the National Coal Association through Bituminous Coal Research, Inc., and pledging the hearty cooperation of the committee in this work. Other resolutions were unanimously approved urging coal-burning equipment manufacturers to give immediate consideration to supplying the committee with funds which will enable it aggressively to pursue field work and organize local committees in all parts of the country in support of the national movement.

Officers elected for the ensuing year are: J. C. Cosgrove, chairman; L. H. Dayhoff, vice-chairman; C. M. Terry, secretary; H. H. Kurtz, treasurer; M. C. Bluth, executive secretary; O. J. Grimes, managing director in advisory capacity. The Board of Directors is composed of: Mr. Cosgrove, chairman; H. M. Hart, Homer R. Linn, J. H. Manny, and R. A. Miller.

Coal Research Men Elect Officers

CHICAGO—Bituminous Coal Research, Inc., has elected the following officers: president, John C. Cosgrove, Johnstown, Pa.; vice-presidents, L. W. Householder, Indiana, Pa.; R. H. Sherwood, Indianapolis and J. W. Carter, Washington, D. C.; treasurer, Col. W. D. Ord, Landgraff, W. Va.; assistant treasurer, C. C. Crowe, Washington, D. C.; secretary, Oliver J. Grimes; assistant secretary, V. V. Wade. The executive committee is composed of Mr. Cosgrove; Douglas Gorman, Baltimore; and Charles G. Berwind, Philadelphia. Headquarters office has been opened at 803 Southern Building, Washington, D. C.

The board of directors authorized the president to set up such standing and special committees as he may find necessary to carry out the purposes of the corporation. It is expected that committees to recommend research facilities, research program, and coordination will be named immediately.

West Coast A. C. Group Meets

SAN FRANCISCO — The semi-annual meeting of the Air Conditioning Society of San Francisco was held at Marquard's December 13. Three excellent talks were presented by H. T. Holbrook, Union Ice Company; James J. Smith, *Coast Banker and Pacific Banker*, and Fred Applegren, Western Blower Company. Mr. Applegren spoke on Unit Heaters and Their Application for Air Conditioning, and Mr. Smith spoke on Features of the Housing Act.

The January luncheon meeting of the Society will be held in the basement of the Fox Theater, during which C. D. Reynolds, engineer of the Fox Theater, will take those attending the lunch on an inspection of the heating and air conditioning equipment of this theater.

SAN FRANCISCO—H. Curby Jamerson, general sales manager of Airtemp, Inc., spoke on Air Conditioning—America's Greatest Potential Industry, at the weekly luncheon of the San Francisco Advertising Club at the Palace Hotel, December 5.

COMING EVENTS

JANUARY 28-30, 1935. *Forty-First Annual Meeting of American Society of Heating and Ventilating Engineers, Hotel Statler, Buffalo, N. Y.*

MAY 20-22, 1935. *Annual convention of the Heating, Piping and Air Conditioning Contractors National Association, Hotel Gibson, Cincinnati, Ohio.*

JUNE 11-14, 1935. *Annual Convention of the National District Heating Association, Bellevue-Stratford Hotel, Philadelphia, Pa.*

OCTOBER 14-18, 1935. *Seventeenth Annual Convention of the American Gas Association, Atlantic City, N. J.*

Whitehead Elected by Stoker Builders

CHICAGO—J. R. Whitehead, manager, stoker and research divisions, Fairbanks, Morse & Co., Chicago, was elected president of the Stoker Manufacturers Association at the annual meeting held in Cleveland, December 10. He succeeds W. H. Rea, president of Detroit Stoker Company.

Important problems facing the industry were discussed in an all-day session and at the annual dinner in the evening the members listened to a talk on "Fair Trade Practices" by W. C. Connolly. Other remarks were made by T. A. Marsh, Iron Fireman Manufacturing Company, and by the new and retiring presidents.

R. B. McClave, president, McClave-Brooks Co., Scranton, Pa., was elected vice-president, succeeding Mr. Whitehead. Harry H. Kurtz, Iron Fireman Manufacturing Co., Chicago, was reelected treasurer, and Marc G. Bluth, Chicago, was reelected secretary.

Brown Instrument Consolidates with Minneapolis-Honeywell

PHILADELPHIA—The Brown Instrument Company will continue as a separate company with its existing organization but as a subsidiary of Minneapolis-Honeywell Regulator Company. Richard P. Brown will continue as president of The Brown Instrument Company and will become an officer and director of Minneapolis-Honeywell.

Brown Instrument sales and service facilities will be continued from the present main office and factory at Philadelphia and the district offices located throughout the country.

Research, development, and engineering activities of the two companies will be coordinated.

MINNEAPOLIS—Harold W. Sweatt, vice-president and general manager of Minneapolis-Honeywell Regulator Company, has been elected president to succeed Mark C. Honeywell, who assumes the chairmanship of the company's executive committee.

American Machine and Metals Acquires DeBothezat Corp.

NEW YORK—American Machine and Metals, Inc., parent organization of several nationally known concerns, has acquired the DeBothezat Corporation, maker of fans, blowers, and other ventilating equipment. The DeBothezat factory has been removed to Troy, New York. Executive and sales offices will be located at 100 Sixth Ave., New York.

A. Ralph Stephan has been appointed vice-president and general manager of the DeBothezat Corporation.

A. C. Bureau of Boston Holds Lively Meeting

BOSTON—One of the most interesting meetings the Air Conditioning Bureau of Boston has held was that on December 13. At the short business session, committee chairmen were appointed by President Julius Daniels, as follows: statistical committee R. H. Nelles; committee to investigate and report on a plan for a national council of air conditioning bureaus and organizations, D. S. Boyden; show committee, to arrange for another exposition of air conditioning equipment next spring, Don J. Edwards; nominating committee, to draw up a list of candidates for officers of the bureau, Howard Parks.

A brief sketch of his trip to the national convention of ice dealers in San Francisco was given by R. G. Hopkins, president of the Boston Ice Company.

The guest speaker of the evening was William J. Fortune, vice-president of the National Shawmut Bank, Boston, who spoke on the "Financing of Air Conditioning Equipment." He told of the bank's personal loan department, which has been functioning for a number of years, financing individual purchase of automobiles and discounting commercial paper of other utilities, as well as personal loans to individuals for various purposes. He stated that his bank was in a favorable position to handle the financing of FHA loans and installations of air conditioning equipment. In all its business of this type, the bank has not lost ½ of 1%, he said.

Charles A. Holcomb was the next speaker, with a summary of a national survey on the effect and progress of the National Housing Act. This was followed by a brief question and answer period. Among those present were William Schmid, assistant to the vice-president, City Ice & Fuel Co., Cleveland, and Oscar Rhode of Chicago, connected with the same company. They told the members present that City Ice and Fuel had made 225 installations of air conditioning during 1934.

3000 Gas Jobs in Boston

BOSTON — The Boston Consolidated Gas Company now has 3000 buildings on its lines or signed up for gas heating, officials of the company announce. As compared with last winter, this is an increase of about 1300, or 76%. At the end of 1926, the company's first year in house-heating, the company had 177 customers.

Gas requirements of the 3000 house-heating customers account for about 15% of the company's total output.

Wisconsin U. to Hold Stoker and Oil Burner Courses

MADISON, WIS.—The College of Engineering of the University of Wisconsin has planned short courses on fuel oil and oil burners, and on solid fuels and stokers to be held at the university. The dates for the oil burner courses will be February 7-9, while the stoker course will be held January 31-February 2.

The oil burner course will consist of three afternoons, one evening, and two morning lectures. The production and characteristics of fuel oil, together with an outline of combustion principles will be treated in the first meeting. Burner types and testing will be the subject at the second meeting, while at a burner servicing session installation and adjustment of burners, selection of oil, and oil burner controls will be discussed. The evening meeting will be an address on an economic or business subject. Merchandising of oil burner equipment, oil burner codes and the competitive position of fuel oil will be treated at the commercial session. On the closing afternoon, building construction as related to fuel consumption, the fundamentals of air conditioning and future trends of heating will be the subjects featured.

The program for the solid fuels course will also consist of three afternoon, one evening, and two morning sessions. At the opening meeting solid fuels and their combustion will be treated. At the commercial sessions the purchasing, selection, storage, and merchandising of coal will be discussed, as well as advertising and relation with customers from the coal dealer's standpoint. At the stoker session, types, installation, servicing, principles, and controls are listed on the program, while at the closing session fundamentals of air conditioning and future trends of heating will be featured.

The oil burner course is being arranged for by a committee consisting of Professors D. W. Nelson, L. A. Wilson, R. A. Rose, B. G. Elliott, and G. L. Larson. Professor L. A. Wilson is chairman of the stoker committee, membership of which consists of Professors Nelson, Elliott, Larson, and E. R. Kaiser.

Canadian Groups May Merge

TORONTO—Executives of the Toronto Society of Domestic, Sanitary and Heating Engineers and the Toronto and District Association of Master Plumbers and Steamfitters will consider the matter of the two organizations amalgamating.

A. C. Correspondence Courses Offered by U. of Illinois

URBANA, ILL. — The University of Illinois has issued a bulletin describing its correspondence courses open to applicants who can meet the university's entrance requirements, and also to persons 18 years old or over whose applications are approved by the university. The normal tuition fee for each course is $5 per semester hour of credit.

Included in the courses available is one on heating, ventilating and air conditioning—4 credits—a prerequisite of which is 3 years of work in the college of engineering, or equivalent. A 3-credits course is available in mechanical refrigeration with a prerequisite of at least one year of work in thermo-dynamics.

Unit Conditioners Now Under Refrigerating Machinery Code

WASHINGTON—The Unit Air Conditioner Manufacturers' Association recently applied to NRA to have included under the Refrigerating Machinery Industry Code all air conditioning machinery and incidental equipment, built with or adapted for a cooling or refrigerating medium. The request also asked withdrawal of the code proposed for the Unit Air Conditioning Industry upon which public hearing was held some months ago.

NRA has approved the request of the Unit Air Conditioner Manufacturers' Association to have this type air conditioning equipment classified under the Refrigerating Machinery Industry Code.

A.C. for Grant Store in Chicago

CHICAGO—Plans have been prepared and work will start January 1 on one of the largest downtown modernization projects in several years—the complete rejuvenation of the five-story structure at the southwest corner of State and Monroe, at a reported cost of $175,000. It is to be occupied by the W. T. Grant Company. The entire building is to be air conditioned; the basement and two selling floors to be cooled during summer months.

Filter Code Authority Approved

WASHINGTON — NRA approved the membership of the code authority for the Air Filter Industry December 14. The members are: J. L. Harpham, Independent Air Filter Company; O. H. Wechsberg, Coppus Engineering Corporation, and H. C. Murphy, American Air Filter Company.

WITH THE MANUFACTURERS • • • •

SAVAGE ARMS CORP., Air Conditioning Div., New York, has appointed Homestead Engineering Corp., Brooklyn, distributor of its air conditioners. Homestead is a new organization, but the ownership and management are the same as of the Brooklyn Electrol Corporation, which has handled the Electrol account in Brooklyn for the past five years, M. S. Kasner being the active head of both companies.

The company has also appointed Buckley and Scott Utilities, Inc., Boston, as distributor for eastern Massachusetts and Rhode Island. The air conditioning department is headed by R. G. Hutchinson, 3rd.

GENERAL REFRACTORIES CO., Philadelphia, Pa., has appointed Collinwood Shale Brick & Supply Co., Cleveland, as dealer-agents in the Cleveland area. The Collinwood Company will carry a complete stock.

ILG ELECTRIC VENTILATING CO., Chicago, has appointed the following representatives: N. J. Bigham, Y.M.C.A. Building, Des Moines; Geo. C. Mittauer, 4966 Hamilton Ave., Omaha, and P. E. Ebersole, 214 S. Victor, Tulsa.

WESTINGHOUSE ELECTRIC & MFG. CO., East Pittsburgh, Pa., has appointed L. D. O'Connell, formerly industrial division manager for its St. Louis office, manager of air conditioning, according to a recent announcement by F. A. Merrick, president. In his new position, Mr. O'Connell will have supervision over sales, engineering, and manufacturing activities of all air conditioning apparatus.

WESTINGHOUSE ELECTRIC & MFG. CO., East Pittsburgh, Pa., has appointed Eugene P. Kiehl, Inc., 2204 Chestnut St., Philadelphia, exclusive distributor for its air conditioning equipment in Philadelphia and southern New Jersey.

Eugene P. Kiehl

COPPUS ENGINEERING CORP., Worcester, Mass., has appointed Ernest E. Lee Co., 53 West Jackson Boulevard, Chicago, to handle the company's line of air filters.

READING IRON CO., Reading, Pa., announces the following promotions and personnel changes:

C. T. Ressler, formerly manager of railroad and marine sales, is appointed specification engineer, sales division. His headquarters will be at 401 North Broad St., Philadelphia.

C. W. Guthrie, formerly salesman in the New York district, is appointed district sales representative for the Columbia territory.

Bryant Myers joins the company's Pacific Coast sales force. His headquarters will be at 213 Sheldon Building, San Francisco.

F. B. Olcott is appointed special representative for handling Government business. His headquarters are at 220 Mills Building, Washington, D. C.

HENRY FURNACE & FOUNDRY CO., Cleveland, has appointed E. Stanley Freeman New England representative. He has leased a warehouse at 205 A St., South Boston.

BINKS MFG. CO. OF CANADA, LTD., has been formed by Neil C. Hurley, president, and J. F. Roche, vice-president and operating head, of the Binks Manufacturing Co., 3106 Carroll Ave., Chicago. The new Binks of Canada will be located at Windsor, Ont., and will facilitate the increasing sale and service of the company's water cooling systems and other products in Canada. Mr. Hurley and Mr. Roche are also the principal officers of the Canadian Corporation.

KISCO BOILER AND ENGINEERING CO., St. Louis, manufacturer of boilers and ventilating equipment, has leased and will shortly occupy new quarters at 4333 Duncan Avenue. The new quarters will give the firm an increase of 4000 sq. ft. of floor space. J. W. Kisling is president of the concern.

REPUBLIC STEEL CORP., Youngstown, Ohio, has announced the appointment of Steel Products Co., McKees Rocks, Pa., as warehouse distributor of Republic's Toncan iron sheets in Pittsburgh area. Three new warehouse distributors of Enduro stainless steel are also announced: Buhl Sons Co., Detroit; F. W. Heitmann Co., Houston, Texas, and The Woodward Co., Albany, N. Y.

STEEL AND TUBES, INC., Cleveland, Ohio, announces that Tubular Service Corporation, which has for some time stocked mechanical tubing made by Steel and Tubes in warehouses in New York, Philadelphia, and Boston, now carries stocks of Electrunite boiler tube in its warehouses at New York and Philadelphia.

NATIONAL OIL BURNER CO., Whitman, Mass., has filed incorporation papers, with capital of 200 shares no-par common stock. George J. J. Clark, of Whitman, is president; G. Loring Clark, West Hanover, Mass., is treasurer. Roger W. Cabell is the third incorporator.

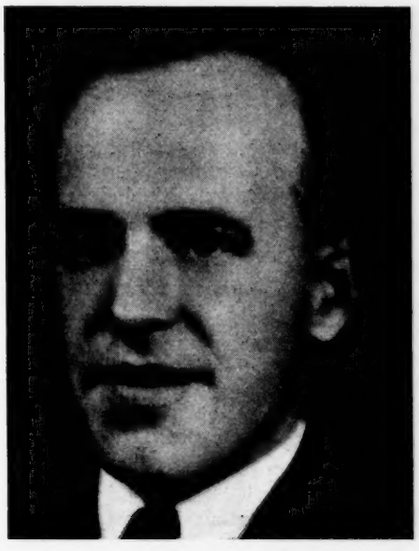
AMERICAN DISTRICT STEAM CO., North Tonawanda, N. Y., has appointed Tomlinson-MacLachlan, Inc., 1603 St. Clair Avenue, as its Cleveland representative.

BARNES & JONES, INC., Boston, Mass., has appointed James A. Walsh, Inc., Philadelphia, as its representative in Delaware, eastern Pennsylvania, and southern New Jersey.

The Walsh organization recently moved into large quarters with a display room on the ground floor of the Architects' Building at 17th and Sansom Streets.

THE MICRO CORP., manufacturer of the Bettendorf oil burner, has appointed R. F. Valentine sales manager of its oil burner division. Mr. Valentine for the past several years has been vice president and sales manager of the Buddy L Mfg. Co., East Moline, Ill.

KELVINATOR CORP., Detroit, has appointed J. S. Garceau advertising and sales promotion manager of the company's air conditioning division. Mr. Garceau has been with Kelvinator since 1927, the past three years as domestic advertising and sales promotion manager. From 1921 to 1925 he had charge of advertising for Detroit Graphite Company, following that connection with two years as director of advertising and sales promotion for Truscon Laboratories. His work in these positions involved association with architectural, construction and building departments and other agencies closely related to the air conditioning field.



John S. Garceau

Jersey Utility Building Heated and Cooled by Heat Pump; Plant Has New Features

ATLANTIC CITY—Reversible air conditioning equipment, which may be adapted to either heating or cooling, depending on the season, is now in operation in the new building of the Atlantic City Electric Co., Salem, N. J. The equipment is of the reversible-cycle refrigerating type, commonly known to engineers as a heat pump. Reversing the cycle of the ordinary household refrigerator, electrically-driven compressors absorb heat from a low temperature source, raise it to a higher level of temperature by mechanical compression of the refrigerant gas, and discharge it at high enough temperature to heat the building in cold weather.

In the summer the process is reversed. Both heat and moisture are withdrawn from the air of the building, and the heat is raised by the compressor to a high enough temperature level to be dissipated outside.

Although installations of this general type have already been made, most of them have depended on outdoor air as the heat source. These have had the lowest heating capacity in winter, when maximum capacity was needed.

At Salem, the heat is drawn from a well of water readily available which maintains a natural temperature of at least 56° in the coldest weather. Hence the equipment is able to deliver its maximum capacity without regard to outdoor weather conditions. The heat is transferred from the water to the refrigerant in a large water cooler, the water leaving the cooler at about 40°. In the compression cycle, the temperature of the refrigerant is raised to 135° and gives up its heat to the air within the building by passing through a condenser over which the air is circulating. In summer, this condenser will act as a cooling surface to cool and dehumidify the air, and the heat thus absorbed will be dissipated by the water cooler, which may then serve as a water heater. Humidifiers for winter use, air filters, and a high velocity fan and air circulating system complete the air conditioning apparatus, maintaining close automatic control of both temperature and humidity within the building summer and winter.

Several new features have been introduced to obtain the maximum economy of operation. Four small compressors, rather than a single large unit, comprise the heat pumps. These will be started and stopped automatically in accordance with the outdoor temperature, which provides a fair index of the heating requirements of the building. This arrangement permits some of the units to be shut down in relatively mild spring and fall weather, while the rest may operate at maximum efficiency. Further refinements in temperature control will be obtained by operating the units intermittently in accordance with the indication of an indoor thermostat. It is anticipated that in most severe weather an electrical input of approximately 20 kw. for the driving motor will produce a heat delivery to the building equal to about 70 kw. expended in direct electric heaters.

Kirby Joins Refrigerating Association Staff

WASHINGTON—John Kirby, formerly special assistant to Dr. Wilson Compton, one-time chief of NRA's trade association division, and later assistant to Wharton Clay, Doctor Compton's successor, has joined the staff of Refrigerating Machinery Association with headquarters here. In his new post, Mr. Kirby will also be actively engaged in the administration of the Refrigerating Machinery Industry Code as assistant to William B. Henderson, the Code Authority's secretary-treasurer.

Huff on Code Authority

WASHINGTON — Approval was given November 16 by NRA to the membership of the code authority for the Scientific Apparatus Industry, the code of which includes controls and instruments used in the heating and air conditioning industries.

Among the members are: W. L. Huff, Minneapolis-Honeywell Regulator Company; M. E. Leeds, Leeds & Northrup Company; H. W. Kimmel, Taylor Instrument Company, and V. F. Davis, Atlas Valve Company.

Asks Steam Rate Increase

NEW YORK—The New York Steam Corporation and affiliated utilities applied to the Public Service Commission December 15 for a 4.4% increase in rates.

1934 H & V INDEX READY!

The annual index for the 12 issues of HEATING AND VENTILATING for 1934 has been prepared and will be mailed on request to any subscriber without cost. Address Subscription Department, HEATING AND VENTILATING, 148 Lafayette St., New York.

Clinic Engineer Speaks in Chicago

CHICAGO—The Illinois Chapter of the A.S.H.V.E. held its regular meeting on December 10, with 38 members and guests in spite of the most severe blizzard of the season.

John Hale presented a certificate of life membership in the society to J. M. Stannard. Mr. Hale told of the activities of Mr. Stannard, William A. Pope, and W. B. Graves in the early days of the Illinois Chapter. Mr. Stannard accepted the honor conferred upon him with a gracious speech.

Dr. E. Vernon Hill introduced the speaker of the evening, Neil D. Adams, superintendent of the Franklin Heating Station, Mayo Clinic, Rochester, Minn. Mr. Adams was active in the design and erection of this plant, and now is in charge of its operation. He gave an excellent illustrated talk on the many problems encountered in the construction and operation of this steam station, beginning with a brief history of the Mayo Clinic.

In the course of his talk, the speaker touched on boiler and furnace construction, stoker and powdered coal firing, natural gas distribution and firing, boiler and domestic water supply and its treatment, power generation and distribution, heating systems, and other interesting facts and figures concerning the Franklin Station.

The feature of Mr. Adams' talk was its frankness. He did not insist that every detail of this plant was perfect from the start, but admitted that mistakes were made and went on to explain how these errors were later corrected.

Denver Adds 600 Gas Jobs

DENVER—A four-month campaign for new gas heating customers, following a reduction of approximately 15% in rates, added 600 heating customers to the lines of the Public Service Company of Colorado—exceeding by more than 100 the expectations when the drive began last September. About 50% of these installed new gas-burning equipment.

Twenty-four salesmen participated in the campaign, which depended principally on house-to-house calls. The campaign was directed by Marion F. Chelf, superintendent of the house-heating division of the company.

Frank Reelected by Fan Makers

NEW YORK—J. M. Frank, president of Ilg Electric Ventilating Co., Chicago, was reelected president of the National Association of Fan Manufacturers at the association's annual meeting held here December 6. R. R. Ware was elected vice-president. E. B. Cresap continues as secretary-treasurer of the organization.

A. S. H. V. E. Prepared for 41st Annual Meeting in Buffalo

BUFFALO — Arrangements are completed for the 41st annual meeting of the A.S.H.V.E., opening at the Hotel Statler January 28. Two technical sessions will be held each day with papers including those on cooling requirements of rooms, studies of ionization, the thermo-integrator, ventilation requirements and heating requirements of buildings.

The program follows:

JANUARY 28—A.M.

8:30 a.m.—Registration.

10:00 a.m.—First Session.

Greeting.

Response by C. V. Haynes, President.

Reports of Officers.

Some Recent Studies on the Ashes in Coal, Prof. T. G. Estep.

Reports of Council Committees.

Report of Committee on Revision of Constitution, By-Laws and Rules.

Report of Tellers of Election.

P.M.

2:30 p.m.—Second Session.

Report of Committee on Research.

Cooling Requirements of Rooms in an Unconditioned Office Building, F. C. Houghten and Carl Gutberlet.

Study of Unit Room Coolers in the Research Residence, A. P. Kratz, M. K. Fahnestock and S. Konzo.

6:30 p.m.—Get-together dinner.

8:30 p.m.—Times Variety broadcast in Terrace Room.

JANUARY 29—A.M.

9:30 a.m.—Third Session.

Report of Guide Publication Committee.

The Nature of Ions in Air and Their Possible Physiological Effects, Prof. L. B. Loeb.

Large-Ion and the Small-Ion Content of Air in Occupied Rooms, G. R. Wait and O. W. Torreson.

P.M.

1:00 p.m.—Past Presidents Luncheon.

1:00 p.m.—Luncheon and card party for ladies.

2:00 p.m.—Fourth Session.

The Design of Solar Heaters, Harold L. Alt.

The Thermo-Integrator—A New Instrument for the Observation of Thermal Interchanges, C.-E. A. Winslow and Leonard Greenburg.

A Laboratory Study of Minimum Ventilation Requirements — Ventilation Box Experiments, by W. H. Lehmberg, A. D. Brandt and Kenneth Morse.

Report of Ventilation Standards Committee.

7:00 p.m.—Banquet and Dance.

JANUARY 30—A.M.

9:30 a.m.—Fifth Session.

The Heat Requirements of Buildings, J. H. Walker and G. H. Tuttle.

Tests of Three Heating Systems in an Industrial Type of Building, G. L. Larson, D. W. Nelson and John James.

P.M.

2:00 p.m.—Sixth Session.

Installation of Officers.

Study of Summer Cooling in the Research Residence for the Summer of 1934, A. P. Kratz, S. Konzo, M. K. Fahnestock and E. L. Broderick.

Members, women, and guests will attend a get-together dinner at 6:30 Monday evening January 28, after which they will witness a radio broadcast of the Times Variety program from the Terrace Room. This entertainment is on a national network and presents a full hour of entertainment with a wide appeal. Following the broadcast there will be dancing.

Concealed Heating Features Canadian Meeting

TORONTO — Over 60 members and guests were in attendance at the December meeting of the Ontario chapter A.S.H.V.E. The feature was an address by Prof. E. A. Allcut, University of Toronto, on Concealed Heating. The speaker stressed the point that much of the inefficiency of this type of heating was due entirely to improper installation and poor workmanship. The other speaker of the evening was E. T. Whittall, May Oil Burner of Canada, Ltd., who discussed the progress made in recent years with the boiler-burner unit.

Cecil Farrar, representing the Western New York chapter, was present to invite members of the Ontario chapter to attend the January meeting of the society in Buffalo.

WARM AIR FURNACE MEN MEET

(Concluded from page 52)

A.S.H.V.E. Laboratory, spoke on the "Comfort Chart and Cold Wall Effect."

Reports from the committee chairman were read as follows: "Credit," by L. B. Murphy; "Public Information," by A. F. Frazee; "Membership," by R. W. Blanchard; and "Trade Relations," by F. E. Mehrings.

F. G. Sedgwick presented the report of the Research Advisory Committee at the morning session, December 6. Mr. Sedgwick listed five projects either finished or prospective, directed by the research committee. The first was the publication of Bulletin 266, issued by the Engineering Experiment Station of the University of Illinois covering "Investigation of Warm-Air Furnaces and Heating Systems." Second was the "Study of Unit Room Coolers in the Research Residence" conducted by Prof. Kratz and Messrs. Fahnestock and Konzo. Third, the "Work on Summer Cooling in the Research Residence" undertaken in connection with mechanical central cooling systems such as could be used in connection with warm-air systems. Fourth, the plans laid by the committee for studying the use of oil burners in connection with warm-air heating plants with the idea in mind of eventually studying furnace oil burner units, and fifth, the publishing of all of the past results of research work in one volume which can be used by members of the industry.

Two papers dealing with the research work at the University of Illinois were presented: "Design and Performance Problems in Forced Air Heating and Air Conditioning" by Prof. A. P. Kratz, and "Studies in Summer Cooling in the Research Residence During the Summer of 1934" by S. Konzo, special research associate. In the former, Professor Kratz explained the method of calculating the forced warm-air system in the research residence and told in considerable detail how the system should be laid out and the results which were obtained.

Mr. Konzo described two types of results, the first from using room coolers and the second using a mechanical compressor in the basement of the research residence. It was found that it is more desirable to maintain a fixed inside temperature than to attempt to adjust it from the outside temperature.

The session Thursday afternoon was held at the Bureau of Mines where members listened to a talk on combustion of fuels by Percy Nicholls, of the Bureau staff, and toured the Bureau of Mines, visiting the fuels laboratory and the laboratory of the A.S.H.V.E. located in the Bureau's building.

Harold E. Humphrey

NEW YORK—Harold Eastman Humphrey, manager since 1919 of the New York office of the General Gas Light Co., Kalamazoo, Mich., died December 13 after a protracted illness.

Mr. Humphrey was born December 8, 1887, and educated at Culver Military Academy and University of Michigan. He was a member of the American Gas Association, Alpha Delta Phi fraternity, and the New York Athletic Club.

He is survived by his widow, Mrs. Vivian Humphrey, a son, Harold Eastman, Jr., a daughter, Vivian, two brothers, George and Hubert, of Kalamazoo, and a sister, Mrs. Helen Jackson of California.

NEW EQUIPMENT

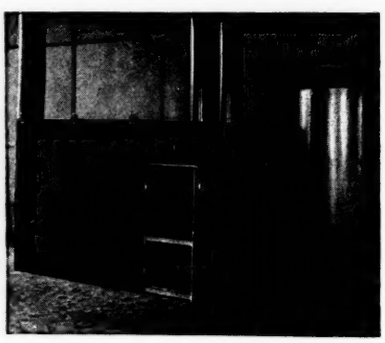
Calorider System of Humidity Control

A dehumidifier and humidifier, the Calorider, has been announced by Research Corp., Chrysler Building, New York. It can be operated in winter in conjunction with any type of heating system, while in the summer it may be used with or without a refrigerating unit.

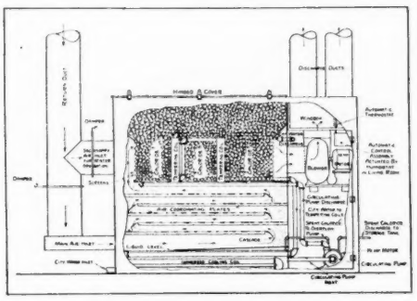
During the summer dehumidifying operation, the system discharges air at about 25% R.H., which rapidly mixes with the room air, lowering the humidity of the room to the desired point. During the winter dehumidifying operation, air is discharged at from 50 to 75% R.H., which is sufficiently moist to properly humidify the larger volume of air in which it diffuses. Operation is governed by an automatic humidistat, which can be adjusted to maintain the desired conditions within close limits.

The operation during the summer is as follows. An inexpensive, moisture absorbing chemical, known as Caloride, is placed in the large compartment in the top of the unit. Air from the space to be conditioned is drawn through the unit in the direction of the arrows, passing several times over the trays containing the liquid Caloride and through wide cascades of the solution pouring over the lips at the alternating opposite ends of the trays. The liquid is kept in rapid circulation by a centrifugal pump. A smaller gear pump on the same shaft forces the spent liquid and the water removed from the air to the sewer or storage tank.

During the passage of the air over the trays and through the cascades, a large part of the ultimate absorption of moisture takes place, and the partially dried air is then drawn through the lower portion of the bin containing the lump Caloride, where additional absorption of moisture reduces the relative humidity of the air to between 25 and 26%. The air, at the same time,



The Calorider



Section (partly schematic) of the Calorider

passes through the tempering coils where it is sufficiently cooled to counteract the heat liberated by drying.

For winter operation, the lump and liquid Caloride is removed and warm water admitted in its place. The function of the unit is now to moisten the air and not to dry it. This is accomplished by passing the air over the trays and through the cascades. In order to prevent objectionable saturation of the air, the secondary air inlet damper is opened to permit a portion of the comparatively dry return air to mix with the moistened air before being discharged from the unit.

France Refractory for Heaters

J. H. France Refractories Co., Snow Shoe, Pa., is manufacturing Hydraulic Refractory Aggregates, ready to be

Hydraulic refractory aggregates

mixed with water, then poured like concrete to form furnace constructions and linings, to simplify the preparation of firepots for oil burning.

This material is shipped in 125-lb. bags with instructions and cardboard forms to suit firepots for all kinds of irregular furnaces. The refractories for standard heating apparatus are made of same material, but are usually precast, and require about 20 min. to install in furnace. Deliveries of pre-cast shapes can be made in 48 hr. by local dealers.

The aggregates when mixed with water and poured, or troweled to form, will air-set to maximum strength in 48 hr.

The company's refractories are made for working temperatures up to 3,200°.

Insulite Sealdslab

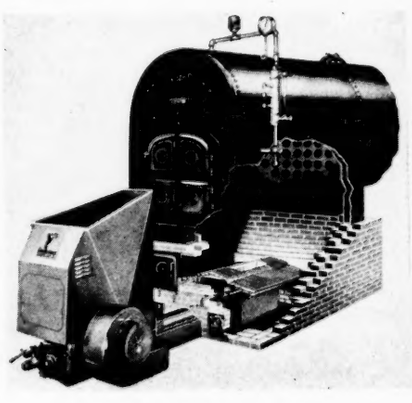
The Insulite Co., Minneapolis, has increased its line of products by adding Insulite Sealdslab. This product is suitable for cold storage insulation.

Butler Model 35 Stoker

Butler Manufacturing Co., 13th and Eastern Ave., Kansas City, Mo., has placed on the market its Model 35 stoker which has capacities from 250 to 1000 lb. This model has an improved hopper design, lower than the older models and easy to fill, and the motor mounting has an automatic belt tightener to maintain the proper tension. The one-piece cast aluminum blower rotor is carried on separate ball bearings so that the motor bearings are relieved of the blower load, while the inlet ring and damper have been improved to reduce noise.

Drive to transmission and blower is through a three center system of V-belt drive using a single belt on the smaller, double belts on the larger sizes. A wide range of feeding rates and air supply is available by changing belt sheaves. The company's continuous drive transmission has been retained, but refined. Improvements include those in the ball bearings, gears, and roller bearings. The shear pin requires no tools for renewal, and one shear pin will serve several times before a new one is needed.

The retort is narrower, longer, and deeper than on previous models which is said to give improved burning characteristics and uniform fuel distribution. Chrome nickel alloys are used in the retort tuyere and grate castings.



Butler Model 35 stoker

American Redi-Return Unit

American Redi-Return Condensation Unit

American Steam Pump Co., Battle Creek, Mich., recently placed on the market the Redi-Return condensation unit, a centrifugal motor-driven device for handling water at 210°. It is available in either a single-unit type with one pump motor and float switch connected to the receiver, or in a twin unit, with two pump motors and float switches. The company recommends the twin-unit, since one can be used as a spare in case repairs or adjustments are necessary, and this unit also affords increased capacity for peak loads.

The pumps incorporated in the unit are an adaptation of the company's Type MUE pumps, which have bronze impellers, readily accessible. The motor is of standard manufacture with a specially machined end bell, so that stock motors can be used as a replacement. Receivers are of steel with welded joints and with a high and low-inlet opening, a top vent, bottom drain, and glass water gauge.

Clip Type Gate Valve

A clip type gate valve with several new features has been added to the line of the Reading-Pratt & Cady Co., Inc., Bridgeport, Conn. This valve has a round bonnet and thus differs from the conventional style clip gate valve. Round bonnet construction permits use of a male and female joint, with an asbestos gasket to assure tightness.

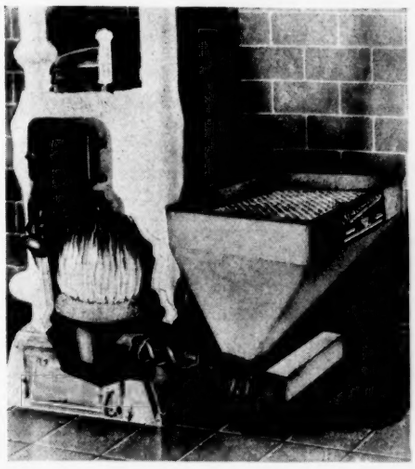
Zephyr 40 Room Unit

Savage Arms Corp., Air Conditioning Div., New York, has announced the Zephyr 40, an air washing-humidifying-ventilating unit, with provision for taking in outdoor air, when desired, by means of a telescoping window panel. This model has humidifying capacity for an average seven-room house and is offered in the $100 price class. The exterior design was styled by John Vassos, industrial designer.

Dickson & Eddy Stokermatic Anthracite Burner

Dickson & Eddy, 17 Battery Place, New York, announce, for resale by its dealer customers, the Stokermatic Anthracite Burner, a popular-priced stoker for domestic use. The line is designed to burn either No. 1 buckwheat or No. 2 rice anthracite. Simultaneously the firm announces Stokermatic Anthracite, available to its dealers in buckwheat and rice sizes.

The burners are being built in two sizes. The Type A is rated at 450 sq. ft. of steam radiator; Type B at 750 sq. ft. A third size, for handling 1,000 sq. ft. is being developed. The burners are being manufactured for Dickson & Eddy by the Catskill Metal Works, and



Stokermatic coal burner

have been tested and approved by the Anthracite Institute.

Features include an underfeed retort construction and air bypass leading from the air tube into the coal tube. The worm feed is supplied coal by gravity from a hopper of 350 lb. capacity; sufficient in the average home for a run of two to three days in average weather, and 24 hr. in zero weather.

Ashes are deposited in the existing furnace pit. For an extra charge a more simplified ash removal method is provided by a "pit type" installation. Such installations include a watertight compartment readily installed under the furnace for special ash receivers supplied to fit it. Ash removal is then accomplished through a dustproof hinged door, assembled integrally with the compartment, and set into the basement floor flush with the boiler base. In practice the user places an empty ash receiver in the pit at each hopper refilling.

The installed price is from $198.50 up.

Detroit Solenoid Valve

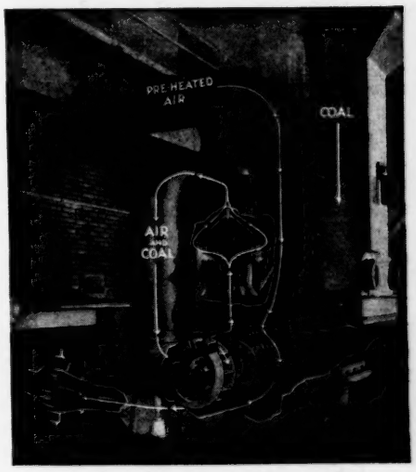
For control or refrigerant lines in air conditioning and general refrigeration work, in connection with refrigerant of methyl chloride, sulphur dioxide, or freon, Detroit Lubricator Co., Detroit, has developed the 683-R solenoid valve. This improved model has larger port orifices, greater lifting power, and reduces the a.c. hum as compared with previous models. It consumes approximately 13 watts and is said to operate continuously without over-heating. It is regularly furnished with ⅜-in. I.P.S. female thread connections, straight-through type.

Unipulvo Pulverizer

The Strong-Scott Mfg. Co., Minneapolis, Minn., builds and installs the Unipulvo underfeed unit pulverizer. Fuel is fed to the pulverizing chamber by an adjustable reciprocating feeder. A rotor is equipped with swinging hammers and revolves at 1750 r.p.m., setting up a fan action which sweeps the incoming fuel over the fuel bed and around the enclosure formed by the pulverizing chamber.

The preheated air required for combustion is drawn into the pulverizing chamber by the exhaust fan, mounted upon the rotor shaft, and grinding is effected by the airswept attrition of fuel-on-fuel. The pulverized fuel passes to a separator which eliminates oversize particles which return to the pulverizing chamber for further reduction, while the finely pulverized fuel passes to a fan and thence to a burner spout.

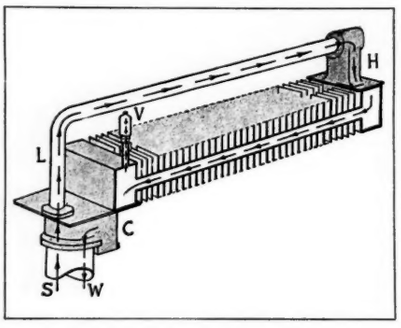
The unit is entirely self-contained and is manufactured in movable models which may be mounted on a truck and moved from boiler to boiler. The pulverizers can be applied to HRT and Scotch marine boilers of 125 rated hp. and over.



Unit pulverizer for large heating plants

Single Pipe Convectofin

A system whereby convector heaters can be used effectively with a one-pipe steam installation has been developed by Commodore Heaters Corp., 11 West 42nd St., New York. It is claimed to



Simplex Convectofin

eliminate the difficulties due to steam and condensation traveling in the opposite directions, a cause of trouble with many one-pipe jobs.

Named the Simplex Convectofin, it operates on the uniflow principle, with series-parallel circulation.

Steam enters at S, travels up the loop L to the heater H. Air and water, if any, are pushed ahead, flowing in the one path but in the same direction. The air is eliminated by an air valve V, while the water of condensation passes on through the compensator C, and flows from the heater at W, out the single pipe connection.

The air valve is located at the extreme end of the heater. While this vent appears to be on the "supply" side, it is actually at the low point of the circuit. As air has to be expelled first, and because it is heavier, an air valve so placed is located to give full service. To provide easy means of connection and ready access, the valve is shown installed on a short nipple.

Propellair Furnace Fan

Propellair, Inc., Springfield, Ohio, has improved its furnace fan, a propeller-type direct motor-driven unit which sits in the cold air return.

The unit is available in three models, No. 17½-2 designed for large homes with six or more rooms. This unit has a ½-hp. motor and a capacity of 1880 c.f.m. No. 12MK is designed for five-room houses and has a 1/50-hp. motor with a capacity of 800 c.f.m. Model No. 11 is the same as No. 12MK except that it has a single propeller and moves 585 c.f.m. This is designed for houses of four rooms and less.

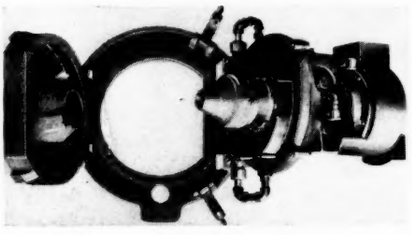
Bailey Feed Water Flow and Boiler Water Level Meter

A meter to indicate and record both boiler water level and feed water flow has been developed by Bailey Meter Co., 1050 Ivanhoe Road, Cleveland, for use in boiler plants where it is desired to have both an indication and record of these factors on the operating floor.

This meter consists of a standard Bailey fluid meter which indicates, records, and integrates feed water flow and a 12 in. indicator with a dial type scale for boiler water level. The indicator is mounted directly above the recording meter on a small feed water panel. If desired, the meter can be located on the individual boiler control panel.

G. & B. Industrial Oil Burners

Gilbert & Barker Manufacturing Co., Springfield, Mass., has introduced a line of industrial oil burners for use in public buildings, industrial plants, apartments, and other buildings. The line is available in 10 sizes ranging



G. & B. heavy duty burner

from 7 to 300 boiler hp. They have gas-electric ignition or an expanding gas pilot, and with or without a built-up pump. They can also be furnished for manual operation. They are designed to burn No. 5 or No. 6 fuel oil.

Atomizing cup is driven at a constant speed of 3450 r.p.m. The a.c. motor has one main shaft to carry the rotor, pump worm drive, fan and atomizing cup. The main shaft of the d.c. motor burner is indirect driven. Oil is fed through the cup through a radial and axial hole in the front of the shaft.

The motor housing is cooled by the primary air drawn over it by the fan. This also raises the temperature of the primary air which assists in atomization. The automatic burner has an electric safety lock which prevents operation when the burner is in the open position. Rotating parts are all dynamically balanced.

Steam-Way Humidifier

The Turney Corp., Muskegon, Mich., has introduced the Steam-Way humidifier for use in connection with warm-air furnaces. One connection is made to the water supply line. The bonnet of the furnace is cut and shaped, the unit placed in a level position with the copper coil resting on the furnace dome, and four sheet metal screws secure the humidifier in position.

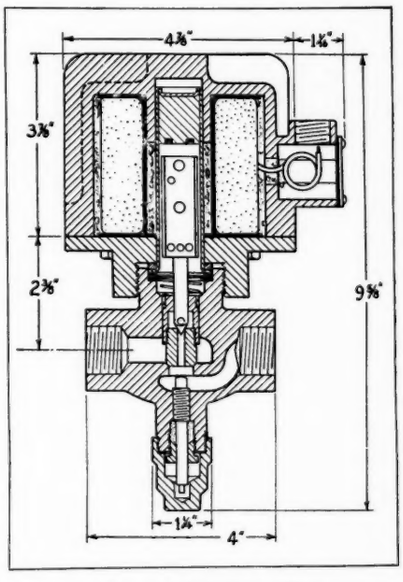
In operation, the humidifier is simple. Water enters the supply chamber at normal city pressure and a constant level is maintained in the supply chamber by a float valve. Water flows from the chamber to the copper flash boiler coil by gravity.

Alco Stop Valves for Refrigerants

A line of magnetic liquid stop valves for liquid freon or methyl chloride is being manufactured by the Alco Valve Co., Inc., 2628 Big Bend Blvd., St. Louis. The line is available in two types, the SJ for smaller applications and the Type SM for larger jobs.

The Type SJ valves consist of three major assemblies, the coil, bonnet, and valve body. The magnetic coil is hermetically sealed to prevent damage from moisture. The coil assembly may be turned as desired to bring the outlet box in to the desired position. An Alco filter and a magnetic protector and fuse block are also provided.

The valves are operated through a thermostat in the cold fixture, room, or substance. When it becomes warmer than the desired temperature the circuit is closed, thus energizing the coil and lifting the valve pin permitting a flow of the refrigerant. In the Type SM valve, the energizing of the magnetic coil causes a plunger to lift an auxiliary pilot pin which relieves the pressure above the piston and permits the pilot to open the main valve.



Alco refrigerant valve

The Type SJ valve is available with either ⅜ or ½ in. I.P.S. connections and has a ¼-in. port. The Type SM valve is available in either ½ in. or ¾ in. I.P.S. connections and has a ½ in. port.

Degree-Days and Unit Fuel Consumption—November, 1934

Continuing HEATING AND VENTILATING's seventh year of publishing degree-day data for various large cities in the United States

	Atlanta	Baltimore	Birmingham	Boston	Buffalo	Chicago	Cincinnati	Cleveland
Degree-days for November, 1934	334	433	268	582	644	576	502	539
Degree-days, Sept. 1, 1934 to Nov. 30, '34	402	691	316	1111	1176	953	766	945
Degree-days, Sept. 1, 1933 to Nov. 30, '33	491	831	385	1239	1468	1238	1004	1180
Degree-days, Sept. 1 to Nov. 30, Normal	492	790	318	1104	1268	1112	863	1125
Lb. coal per sq. ft. rad., November, 1934	2.672	3.464	2.144	4.656	5.152	4.608	4.016	4.312
Gal. oil per sq. ft. rad., November, 1934	0.229	0.297	0.184	0.399	0.442	0.395	0.344	0.370
Cu. ft. gas per sq. ft. rad., November, '34	32.06	41.57	25.73	55.87	61.82	55.30	48.19	51.74

	Davenport	Denver	Des Moines	Detroit	Duluth	El Paso	Fort Wayne	Grand Rapids
Degree-days for November, 1934	589	620	660	639	920	290	617	624
Degree-days, Sept. 1, 1934 to Nov. 30, '34	935	1031	1055	639	1837	307	1037	1109
Degree-days, Sept. 1, 1933 to Nov. 30, '33	1228	850	1241	1332	2163	289	1308	1430
Degree-days, Sept. 1 to Nov. 30, Normal	1158	1259	1155	1219	1943	421	1082	1250
Lb. coal per sq. ft. rad., November, 1934	4.712	4.960	5.280	5.112	7.360	2.320	4.936	4.992
Gal. oil per sq. ft. rad., November, 1934	0.404	0.425	0.453	0.438	0.631	0.199	0.423	0.428
Cu. ft. gas per sq. ft. rad., November, '34	56.54	59.52	63.36	61.34	88.32	27.84	59.23	59.90

	Harrisburg	Hartford	Indianapolis	Kansas City	La Crosse	Los Angeles	Louisville	Memphis
Degree-days for November, 1934	530	587	552	508	741	99	447	283
Degree-days, Sept. 1, 1934 to Nov. 30, '34	909	1085	849	733	1283	141	637	344
Degree-days, Sept. 1, 1933 to Nov. 30, '33	1144	1278	1088	784	1572	174	848	478
Degree-days, Sept. 1 to Nov. 30, Normal	989	1097	985	826	1467	123	738	464
Lb. coal per sq. ft. rad., November, 1934	4.240	4.696	4.416	4.064	5.928	0.792	3.576	2.264
Gal. oil per sq. ft. rad., November, 1934	0.363	0.403	0.379	0.348	0.508	0.068	0.307	0.194
Cu. ft. gas per sq. ft. rad., November, '34	50.88	56.35	52.99	48.77	71.14	9.50	42.91	27.17

	Milwaukee	Minneapolis	New Haven	New Orleans	New York	Omaha	Peoria	Philadelphia
Degree-days for November, 1934	649	787	545	77	505	631	574	485
Degree-days, Sept. 1, 1934 to Nov. 30, '34	1141	1387	996	77	871	957	926	773
Degree-days, Sept. 1, 1933 to Nov. 30, '33	1390	1636	1174	95	1017	1081	1198	873
Degree-days, Sept. 1 to Nov. 30, Normal	1380	1537	1092	102	894	1109	1173	830
Lb. coal per sq. ft. rad., November, 1934	5.192	6.296	4.360	0.616	4.040	5.048	4.592	3.880
Gal. oil per sq. ft. rad., November, 1934	0.445	0.540	0.374	0.053	0.346	0.433	0.394	0.333
Cu. ft. gas per sq. ft. rad., November, '34	62.30	75.55	52.32	7.39	48.48	60.58	55.10	46.56

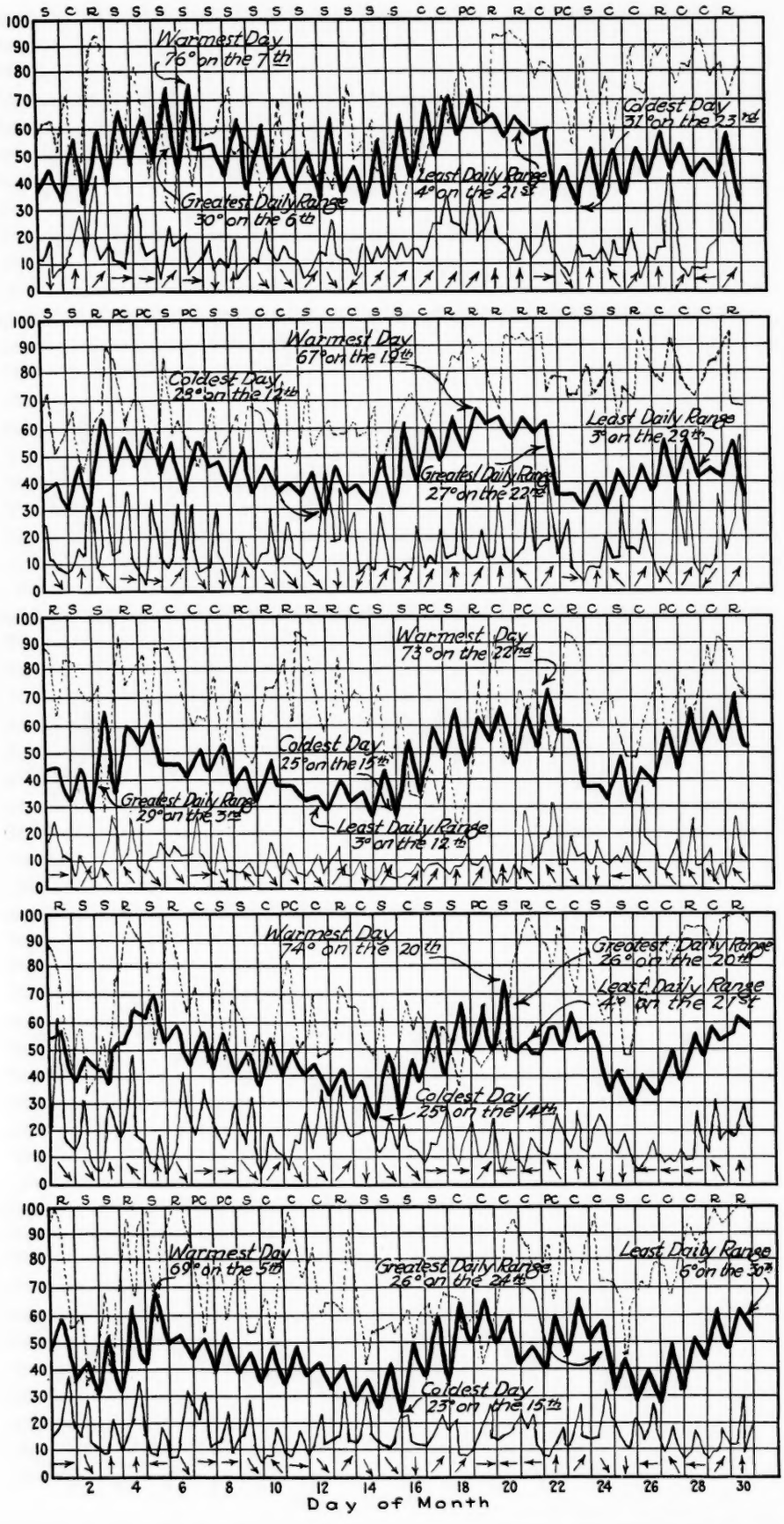
	Pittsburgh	Portland, Ore.	Providence	Reading	Rochester	St. Louis	Salt Lake City	San Francisco
Degree-days for November, 1934	545	442	582	492	627	443	626	197
Degree-days, Sept. 1, 1934 to Nov. 30, '34	911	800	1070	875	1154	617	1048	400
Degree-days, Sept. 1, 1933 to Nov. 30, '33	1129	968	1238	1007	1467	829	897	414
Degree-days, Sept. 1 to Nov. 30, Normal	982	995	1103	1013	1289	802	1129	521
Lb. coal per sq. ft. rad., November, 1934	4.360	3.536	4.656	3.936	5.016	3.544	5.008	1.576
Gal. oil per sq. ft. rad., November, 1934	0.374	0.303	0.399	0.337	0.430	0.304	0.429	0.135
Cu. ft. gas per sq. ft. rad., November, '34	52.32	42.43	55.87	47.23	60.19	42.53	60.10	18.91

	Scranton	Seattle	Spokane	Syracuse	Toledo	Trenton	Washington, D. C.	Wichita
Degree-days for November, 1934	582	452	644	603	605	503	461	462
Degree-days, Sept. 1, 1934 to Nov. 30, '34	1116	936	1331	1139	1037	895	744	641
Degree-days, Sept. 1, 1933 to Nov. 30, '33	1361	1115	1442	1486	1308	1086	885	650
Degree-days, Sept. 1 to Nov. 30, Normal	1189	1165	1526	1319	1110	830	845	828
Lb. coal per sq. ft. rad., November, 1934	4.656	3.616	5.152	4.824	4.840	4.024	3.688	3.696
Gal. oil per sq. ft. rad., November, 1934	0.399	0.310	0.442	0.413	0.415	0.345	0.316	0.317
Cu. ft. gas per sq. ft. rad., November, '34	55.87	43.39	61.82	57.89	58.08	48.29	44.26	44.35

Fuel consumption figures given above are based on certain conditions, and for other conditions corrections must be made. The figures assume the use of steam radiators emitting 240 B.t.u. per sq. ft. per hr., a system operating at 100% efficiency, and radiators calculated for maintaining 70° in zero weather. Heating values assumed for the fuels are 12,000 B.t.u. per lb. for coal, 1000 B.t.u. per cu. ft. for gas, and 140,000 B.t.u. per gal. for oil. To correct for other heating values, efficiencies, and design conditions, follow the method explained in the "Heating and Ventilating Degree-Day Handbook."

THE WEATHER FOR NOVEMBER, 1934

Plotted from records especially compiled for HEATING AND VENTILATING by the U. S. Weather Bureau. Heavy curves (T), temperatures in deg. F.; dotted lines (H), per cent relative humidity, from readings at 8 a.m., noon, and 8 p.m., except for New York, which shows hourly readings. Light lines (W), wind velocity in m.p.h. Arrows indicate prevailing wind directions. S—clear; PC—partly cloudy; C—cloudy; R—rain, Sn—snow.


Warmest Day 76° on the 7th
Coldest Day 31° on the 23rd
Least Daily Range 4° on the 21st
Greatest Daily Range 30° on the 6th
Warmest Day 67° on the 19th
Coldest Day 29° on the 12th
Least Daily Range 3° on the 29th
Greatest Daily Range 27° on the 22nd
Warmest Day 73° on the 22nd
Coldest Day 25° on the 15th
Greatest Daily Range 29° on the 3rd
Least Daily Range 3° on the 12th
Warmest Day 74° on the 20th
Greatest Daily Range 26° on the 20th
Least Daily Range 4° on the 21st
Coldest Day 25° on the 14th
Warmest Day 69° on the 5th
Greatest Daily Range 26° on the 24th
Least Daily Range 5° on the 30th
Coldest Day 23° on the 15th
Day of Month

St. Louis

Mean temp. for month, 50.4°; aver. wind velocity, 14.2 m.p.h.; prevailing direction of wind, S.

Chicago

Mean temp. for month, 45.8°; aver. wind velocity, 12.3 m.p.h.; prevailing direction of wind, S.W.

Pittsburgh

Mean temp. for month, 46.8°; aver. wind velocity, 9.6 m.p.h.; prevailing direction of wind, S.W.

New York

Mean temp. for month, 48.2°; aver. wind velocity, 15.7 m.p.h.; prevailing direction of wind, N.W.

Boston

Mean temp. for month, 45.6°; aver. wind velocity, 14.3 m.p.h.; prevailing direction of wind, W.

The SOFT AIR *Sales Story is full of* HARD FACTS!

A STRONG LINE
for the
STRONG DEALER

1. Domestic Oil Burners
2. Arco-Petro Oil Furnaces
3. Industrial Oil Burners
4. Commercial Oil Burners
5. Hot Water Heaters
6. Pumps, Boiler Controls, etc.
7. Light and Heavy Fuel Oil

Is your territory open? Write. We will tell you.

HERE'S a quick summary of the Petro-&-Nokol SOFT AIR sales approach . . . the approach that wins names on burner contracts.

SOFT FLAME—Every Petro-&-Nokol burner produces clean combustion, yet relatively with a *softer flame* than average. *Not* blown through the boiler and up the chimney by a high pressure blast. Your prospect catches the idea and agrees on its value without any argument.

QUIET—*Real* quiet, due to reduced velocities and easy operating speeds. That appeals to the prospective buyer as both reasonable and believable.

ECONOMICAL OPERATION—Low stack temperatures, translated into terms of actual money saving. No heat "hijacked" out of the firebox and wasted. Every home owner grasps the explanation at once.

The detailed facts covering these main points back up the Petro-&-Nokol SOFT AIR story 100%. Evidence in terms of R. P. M., CO_2 determinations, low stack temperature readings, and actual performance records.

This is material *you* find interesting, but the average prospect never bothers about it *until you start to tell him the* SOFT AIR *story*. Then these important facts are made clear and understandable to the most non-technical minded prospect.

As a selling tool the SOFT AIR presentation is so effective that we have protected every detail of it by U. S. Copyright.

And there's a SOFT AIR angle to every burner in the line. An angle exclusive to Petro-&-Nokol.

So you can see that the Petro-&-Nokol franchise is valuable. And that good territory is seldom open. And never open long. So if you'd like to "line up" write. Or wire.

© 1935 Petroleum Heat & Power Company

PETRO-&-NOKOL

Domestic — Commercial — Industrial Oil Burners

M'f'd by PETROLEUM HEAT & POWER CO., Stamford, Connecticut

Oldest and Largest Organization exclusively devoted to Oil Heating

A.S.M.E., A.S.R.E. Meetings and Power Show

(Concluded from page 51)

same domestic heating job. Included in the author's paper were curves showing test results.

To speak for gas, a paper written by R. B. Leckie was presented. In this the author outlined the growth and development of the use of gas for domestic heating. The kinds of burners available were classified as gas-designed and gas-converted. The past few years have seen conversion burners come to the fore. Professor Leckie pointed out that a substantially equivalent efficiency can be secured with either type of burner under the proper conditions.

When the discussion got under way several of those present interested in the use of gas presented further ideas using lantern slides to illustrate recent installations. A great deal of the discussion was by those advocating the use of coal, especially those who advocate automatic stokers for domestic use. Much of the discussion was comparative and tended to bring out the merits of the rival fuels.

Other papers on the program of interest to heating and ventilating engineers included a number on several phases of heat transmission. Among these was one by Harvey Feldmeier on "Heat Transfer in Dairy Apparatus," while another by Arnold Weisselberg discussed the status of heat transfer between liquid and gas in contact. In addition there were two papers dealing with the dust hazard in industry.

It was announced that C. E. Davies, who for many years has served as executive secretary of the society, has been appointed secretary in place of Calvin W. Rice, deceased.

A. S. R. E. Anniversary

An anniversary spirit was evident during the meeting of the American Society of Refrigerating Engineers whose sessions met at the Hotel New Yorker on December 5, 6, and 7. The meeting was the 30th anniversary of the society, and one of the features included attendance by a number of the charter members who were honored during the course of the annual dinner Thursday evening.

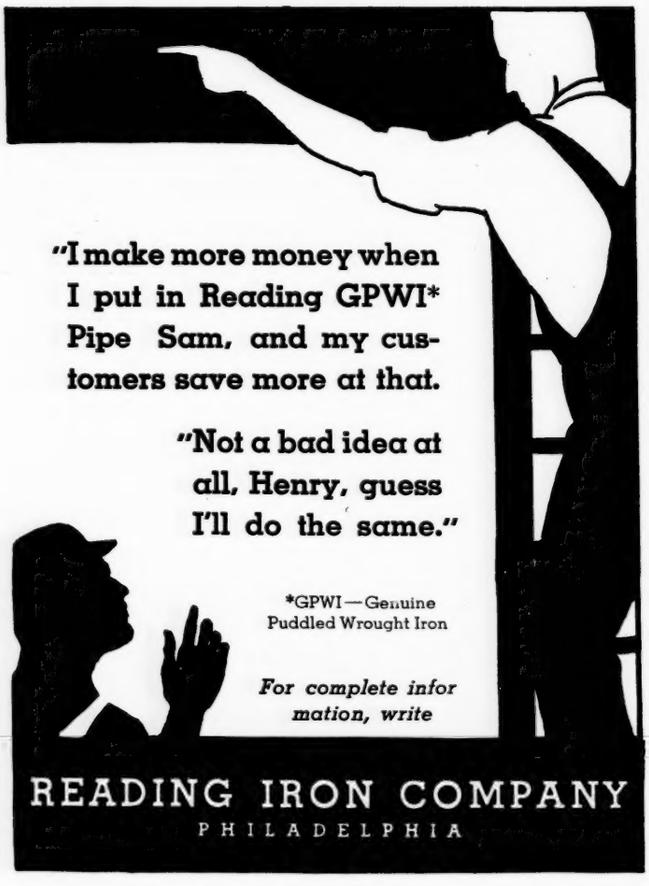
One of the most interesting papers on the program was that of A. D. Moore on "Visual Heat Transfer Measurement." Professor Moore demonstrated apparatus which he has constructed whereby many temperature and heat flow problems can be solved by using the water analogy. His instrument uses water flowing in tubes against resistances which are set up to correspond to resistances of heat flow through materials. Use of this ingenious device is expected to make possible the quick solution of many difficult problems of heat flow through materials.

Other papers were "Air as a Refrigerant," by R. U. Berry, General Electric; "Glass Wool Insulation," by D. C. Simpson, Owen-Illinois Glass Co.; and "Heat Transmission in Cooling of Air with Extended Surfaces," by W. L. Knaus, General Electric.

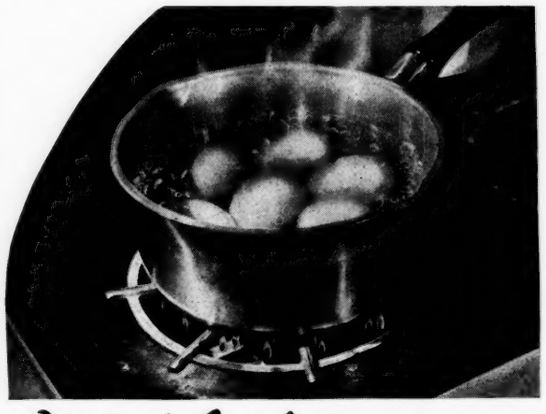
Attendance at the meeting, which was around the 300 mark, was greater than any of the recent meetings which the society has held.

Power Show

The 11th Power Show at Grand Central Palace while the society meetings were going on attracted a high attendance both on the part of those who were following the meetings and those interested in the various kinds of power equipment. The Show was built around the central theme of "Cutting Costs in Power Production" and exhibitors arranged for showings with this in mind. A great variety of power equipment was presented although the Show differed from many of its predecessors by the conspicuous absence of power plant stokers and large boilers. On the other hand, there was considerable more machine tool, power transmission, and specialty equipment shown. Attendance at the Show is reported to have passed previous records.


"I make more money when I put in Reading GPWI* Pipe Sam, and my customers save more at that.
"Not a bad idea at all, Henry, guess I'll do the same."
*GPWI—Genuine Puddled Wrought Iron
For complete information, write
READING IRON COMPANY
PHILADELPHIA

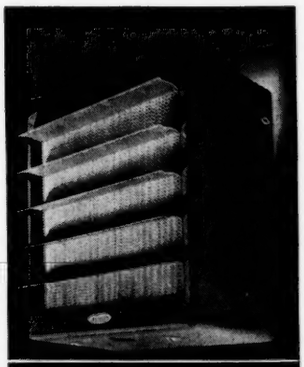
SCIENCE AND INVENTION HAVE NEVER FOUND A SATISFACTORY SUBSTITUTE FOR GENUINE PUDDLED WROUGHT IRON



Hard boiled ENGINEERS like FEDDERS Series 3 UNIT HEATERS

Pat. 1,970,105; other Pats. Pending

Handsome sturdy cabinets, high efficiency streamline tubes, patented fin construction, quieter operation, full-floating element mounting, elimination of intertube expansion stresses are just a few advanced engineering features of Fedders Series 3 Unit Heaters. Write for Catalog 527.



FEDDERS MANUFACTURING COMPANY
57 Tonawanda Street Buffalo, N. Y.

Private Power Plant for Apartment Cuts Operating Costs

(Concluded from page 49)

In the latest plant the hot water heating boiler, formerly used in summer, has been transferred into a feed-water-and-return storage tank, supplemented by a mixer in which the exhaust steam and the water meet before entering the tank.

Operating Results

The results of the first year's operation for the two plants are, in round figures, as follows:

Actual total cost of operating complete steam and electrical generating plants, including $200 per month for outside supervision, was	$40,569
Cost of operating steam plants only, prior to the plant installation with allowance for increased occupancy, was	26,379
Cost of electricity if purchased	43,893
Production cost of electricity, including $3,825 fixed charges at 8½%	22,235
Reduction in cost of electricity	21,658
Per cent reduction in cost of electricity (after allowance for interest and amortization)	49%

The principal factors which make possible and profitable the installation of private electrical generating plants in apartment houses are:

1—High load factor due primarily to individual electrical refrigerators and, secondarily, to electrical appliances.

2—Need of steam for heating and hot water. This results in over half the electricity being produced substantially as a byproduct of the heating.

3—With the single-unit plant automatically fired and controlled, no more men are needed than without the plant, only higher-priced, more-skilled labor is required.

These plants are steam operated. Contracts have recently been closed for a Diesel-operated electrical plant for a group of apartment buildings in the Bronx, where because of the small load and extended distribution system required, the steam system did not prove to be as good as the Diesel plant.

FHA Insured Modernizing Loans Reach Nearly $30 Million

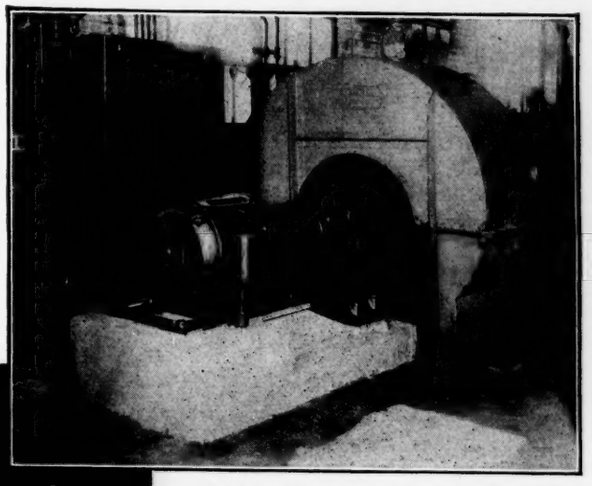
(Concluded from page 50)

McDonough, president, Building Trades Department, American Federation of Labor, and S. F. Voorhees, of Voorhees, Gmelin & Walker, New York architects.[4]

At its first meeting the Council appointed sub-committees and considered the need for legislation in several states suggested in a recent letter from President Roosevelt to the governors. Legislation by the states is necessary, it was explained in the conference, to place chartered lending institutions on an equality with national banks in making mortgage loans under the terms of the National Housing Act. National Banks may loan up to the 80% of appraised value on mortgages which FHA will insure. In practically all of the states, savings banks and other lending institutions operating under state laws cannot loan in excess of 60% of appraised value, and rarely in excess of 50%.

[4]Following the organization of the Council, Mr. Barrett was made chairman of a committee on "Low-Priced Plumbing Fixtures and Heating Units." Other members are Mr. Hamilton, F. L. Ackerman, technical director of New York City Housing Authority, and Wayne F. Palmer, executive secretary of the Housing Advisory Council.

Multi-Speed *Motors for fans*



2 SPEED

3 SPEED

4 SPEED

CONSTANT TORQUE

CONSTANT H P

VARIABLE TORQUE

PICTURED above is a Wagner multi-speed motor driving a forced-draft fan in the boiler house of a large drug company. It is a 25/11/6.2 horsepower, 1725/1140/860 rpm variable-torque type MRP-1 motor.

When it's a multi-speed motor application — consult Wagner. 2-speed, 3-speed, or 4-speed—constant - torque, constant - horsepower, or variable-torque — open frame, drip-proof, or totally-enclosed fan-cooled — horizontal or vertical — sleeve or rolling bearing — ½ or 125 hp—whatever the motor requirement may be, there's a Wagner multi - speed motor designed and built for the job.

The motor illustrated above as well as other types of Wagner multi-speed motors, is described in Bulletin 174. Ask for a copy.

WAGNER ELECTRIC CORP.
6463 Plymouth Ave., St. Louis, U.S.A.
MOTORS TRANSFORMERS FANS BRAKES

WAGNER ELECTRIC CORPORATION,
6463 Plymouth Ave., St. Louis, U. S. A.

Please send literature on multi-speed motors.

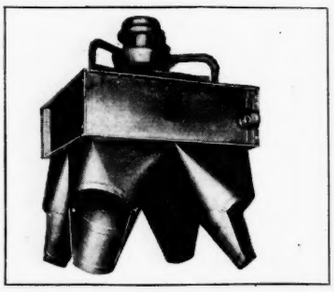
Name and Position

Firm

Address

M333-1

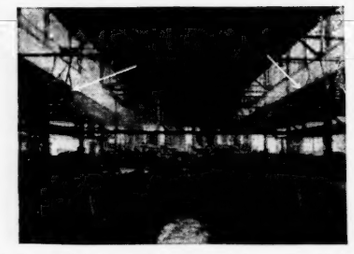
Wing Featherweight Heater



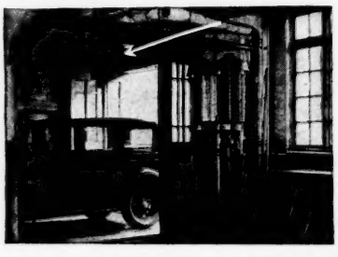
HERE
is a
UNIT HEATER
that is
ENTIRELY
DIFFERENT
(*the floodlight of heating*)

FOR THE PLANT

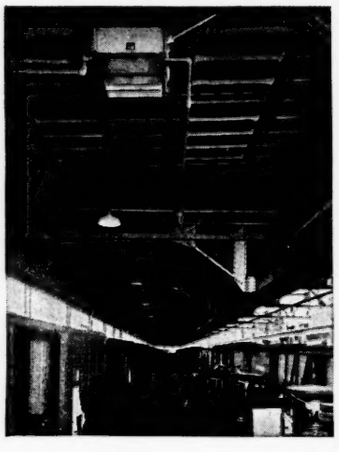
FOR THE FOUNDRY



FOR THE ENTRANCE



FOR THE SHIPPING PLATFORM

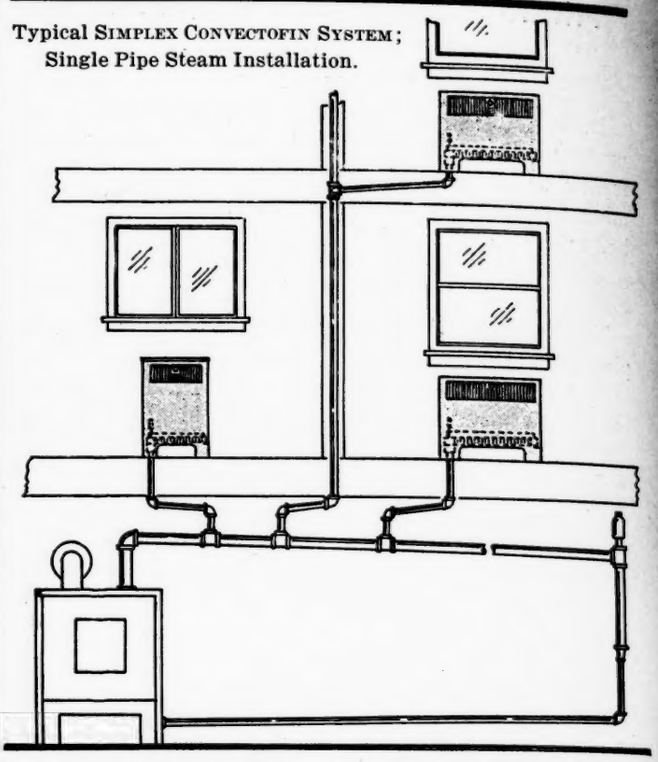


It supplies uniform heat in every nook and corner and at every working level. The last word in scientific heating—(floodlight heating).

Send for bulletin

L. J. WING MFG. CO.
158 W. 14th St. New York City
955 ST. JAMES ST., W. MONTREAL, CANADA

Typical SIMPLEX CONVECTOFIN SYSTEM; Single Pipe Steam Installation.



ONE-PIPE

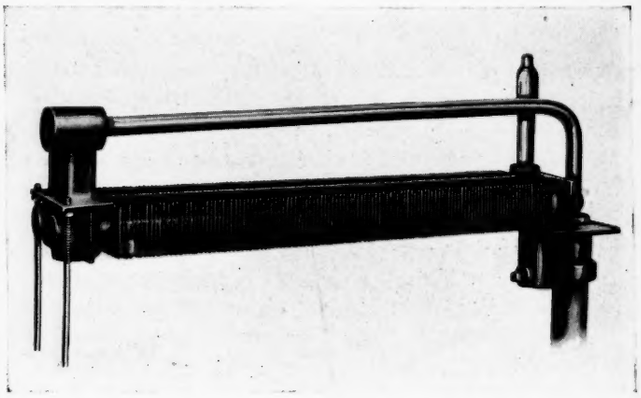
Heating Successfully Accomplished with the

BUILT-IN HEATER

Guaranteed operation...Uniflow cycle instead of Counterflow. Can't air bind or Water-log.

Simplex CHC CONVECTOFIN CHC *System*
the BUILT-IN HEATER

Works like a standard two-pipe job, but only a single pipe connection is used. Steam, condensate, and air flow in the SAME direction, always. Air binding and water-logging are eliminated. Simple. Automatic. Positive. There is nothing else like the Simplex Convectofin System for one-pipe steam heating. Full details on request.



See page 70 for a description of our two-pipe system.

COMMODORE HEATERS CORP.
20 W. 43rd St. New York, N. Y.

LARGE SCALE HOUSING

as exemplified in the Hillside Housing Project, New York City. Over 1400 low rental apartments will be available by next spring.

One of the PWA financed housing projects which constitute a new market for heating as explained in this issue.